The RUBBER AGE

April 1948

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Vanstay

...VINYL RESIN STABILIZER

COLOR catches the EYE

Keep color Bright in Your Vinyl-Resin Products by STABILIZING against HEAT and LIGHT deterioration with

Vanstay-16

For clear and clear-printed films.

Vanstay-25

For loaded colored films

These two VANSTAY products and their use are fully described in our VANSTAY folder of March 1, 1948. Ask for a copy.

R. T. VANDERBILT CO. INC.

230 Park Avenue, New York 17, N. Y.

√R v.63 April-Sept. 1948

1 one does it!

A non-staining, non-discoloring ANTIOXIDANT

as well as an accelerator . . .

. . . Du Pont ZENITE

Has outstanding advantages in natural rubber stocks.

EFFECTIVE ANTIOXIDANT PROTECTION—When used in excess of the amount required for acceleration, Zenite functions as an effective non-blooming antioxidant. *In such compounds no other antioxidant is necessary.*

VERSATILE ACCELERATION—Safe-processing compounds having a wide range of cure rates may be obtained with Zenite acceleration.

FREEDOM FROM DISCOLORATION AND STAINING—Even when present in large amounts, Zenite does not contribute to sunlight discoloration . . . does not stain finishes of the "Dulux" and "Duco" types.

Tune in Du Pont "CAVALCADE OF AMERICA" Monday nights—NBC Coast to Coast

For complete details consult BL-222, "Zenite as a Non-staining, Non-discoloring Antioxidant." If you would like an extra copy, write:

E. I. du Pont de Nemours & Co. (Inc.), Rubber Chemicals Division, Wilmington 98, Delaware.

DU PONT RUBBER CHEMICALS

E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Del.

DU PONT
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Tech

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

THE RUBBER AGE, published monthly by The Palmerton Publishing Co., Inc., Printing Office, East Stroudsburg, Pa. Editorial and Advertising Offices at 250 West 57th Street, New York 19, N. Y. Entered as second class matter October 20, 1933, at the Post Office at East Stroudsburg, Pa., under the Act of March 3, 1879. Subscription in United States, $3.00 a year; Canada, $3.50; Foreign, $4.00. April, 1948. Vol. 63, No. 1.

TWO NEW HYCAR AMERICAN RUBBERS

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Hycar OR-25 EP *(Easy Processing)*
Hycar OR-25 NS *(Non-Staining)*

HERE are two new American rubbers, both with superior processing characteristics. Hycar NS and Hycar EP differ only in that a special anti-oxidant has been used in the NS, making it non-staining and non-discoloring. This is an outstanding quality, particularly desirable in the fabrication of light colored products. The new Hycar rubbers have all these advantages over the regular process Hycar OR-25:

1. They band on the processing mill speedily—cut mill mixing time.
2. Better extrusion characteristics—less nerve and less heat build-up.
3. Excellent high temperature mixing.
4. Better fusion and mold flow characteristics.
5. Increased building tack for laminated products, such as frictioned stocks and calendered sheeting.

Both rubbers retain those properties which make Hycar American rubbers so usable for so many products . . . permanent resiliency and superior resistance to oil, abrasion, and aging. Ask your supplier for parts made from Hycar. Or write to Dept. HB-4, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

Hycar
Reg. U.S. Pat. Off.
American Rubber

B. F. Goodrich Chemical Company
A DIVISION OF THE B. F. GOODRICH COMPANY

GEON polyvinyl materials • HYCAR American rubber • KRISTON thermosetting resins • GOOD-RITE chemicals

ACCIDENTS WILL HAPPEN!

Tire manufacturers know that any tire may be accidentally cut. And in many cases, the cut grows rapidly larger. But that hazard can be lessened if you just put Philblack O to work. This new HAF (High Abrasion Furnace) black helps make tires highly resistant to cut and crack growth. It increases their resistance to abrasion and greatly improves flex life.

Yes, Philback O is a marvelous aid in obtaining a long and trouble-free life for your tires. Give your tires this desirable quality by using this black magic!

And if you require some other particular property in your product . . . if you have a special rubber problem . . . please feel free to consult our technical staff.

PHILLIPS PETROLEUM COMPANY

Rubber Chemicals Division

EVANS SAVINGS AND LOAN BUILDING · AKRON 8, OHIO

Stirrings of the future

NEW GEON paste resins mean simplified molding, casting, coating, and dipping

THE picture you are looking at is *not* an exaggeration.

"Geon Paste Resins" means new things in the vinyl plastics field. A new resin-plasticizer paste can now be prepared by a simple stirring operation. In many applications it will eliminate the need for heavy and expensive milling equipment, grinding, dangerous volatile solvents, and high pressure molding, calendering or extruding operations.

The new Geon Paste Resin can be mixed as simply as you see it done here. Color—any color, brilliant or pastel—can be added. The mixture can be molded, cast, extruded—used for coating and dipping for paper and textiles. Thin, medium, or heavy films can be developed—supported or unsupported. These can be beautifully embossed or printed as simply as those produced by any other process. And in casting, there is virtually no shrinkage in the mold even though no pressure is used. In dipping and coating, usually only *one* operation is called for. Yet Geon Paste Resin results in a tough, homogeneous, and flexible body.

From packaging to luggage, upholstering to shoe soles, toys to large electrical cables, Geon Paste Resin will make its contribution. We make no finished products from Geon or from any of our other raw materials. However, we are glad to work on special problems or applications. And we believe you will want the bulletin just published on Geon Paste Resin. To receive it, please write to Department R-4, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, O.

B. F. Goodrich Chemical Company

A DIVISION OF THE B. F. GOODRICH COMPANY

GEON polyvinyl materials • HYCAR American rubber • KRISTON thermosetting resins • GOOD-RITE chemicals

Good-rite
VULTROL
for use in American rubber compounding
to prevent scorching, and for recovering
scorched stocks
GOOD-RITE AND VULTROL REG. T.M. U.S. PAT. OFF.

For technical data please write Dept. CB-4

B. F. Goodrich Chemical Company

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ROSE BUILDING, CLEVELAND 15, OHIO

GEON polyvinyl materials • HYCAR American rubber • KRISTON thermosetting resins • GOOD-RITE chemicals

Can you find

More Than 16 Ounces

in a Pint Can

?

Many manufacturers have . . . especially when the can held a development sample of Flintkote Liquid Products.

They've often found the welcome answer to a troublesome requirement for coating, laminating, saturating, bonding or other fabrication problem.

We, at Flintkote, make a broad line of liquid asphalt, resin and rubber products . . . both in aqueous dispersions and in solvent form. In addition to standard products, we've helped meet many special requirements that called for custom-made materials.

As a result, Flintkote Liquid Products find wide use in many branches of industry. Some are used for rug and carpet backing, others as paper and textile laminants and sizings, curled hair binders, or adhesives.

Chances are, in our standard line . . . or in our research files . . . there's a solution to *your* problem. If not, our technical staff will be glad to work with you, to discover what you need.

A letter outlining your problem will put our complete research, development and manufacturing facilities at your disposal.

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CREATE CLEAR TINTS IN RUBBER

with *Titanox* pigments

In colored rubber, TITANOX pigments create an enviable clarity of tint that helps your products stand out in competition. The chemical stability and physical inertness of these famous titanium dioxide pigments assure maximum resistance to discoloration of tinted rubber compounds in which they are used.

In white rubber stocks, the TITANOX line imparts a maximum of whiteness, brightness and opacity.

Our Technical Service Laboratories are maintained to help you use TITANOX pigments most advantageously and economically. We invite your request for this assistance.

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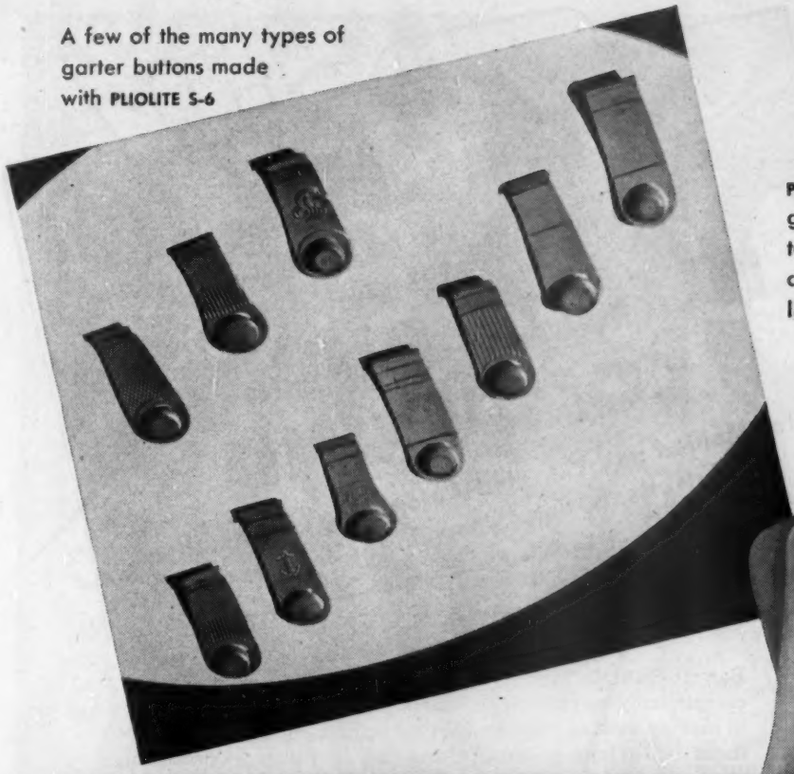
A few of the many types of garter buttons made with **PLIOLITE S-6**



PLIOLITE S-6 gives added toughness and flex life

RIGHT on the button

PLIOLITE S-6

GARTER buttons need a tough rubber stock with good stamina and flex life and the right degree of hardness and stiffness. Moreover, since these items are made in light colors, reinforcement must be obtained without the use of carbon black.

A large manufacturer of garter buttons and similar items reports highly satisfactory results with **PLIOLITE S-6,** used as a reinforcement to non-black stocks.

You will find **PLIOLITE S-6** to be ideally suited to all compounds needing a light-color, low-gravity stock of 70-100 durometer hardness with good processing characteristics and moldability. It is effective with GR-S, Neoprene, Buna N and natural rubber.

PLIOLITE S-6 is available as a powder for your own mixing, or in master batches in whatever synthetic you select. For complete information and sample, write: Goodyear, Chemical Products Division, Plastics and Coatings Dept., Akron 16, Ohio.

GOODYEAR

1898 GOODYEAR 50 ANNIVERSARY 1948

Pliolite—T. M. The Goodyear Tire & Rubber Company

RECIPE

(from the Barrett Rubber Research Laboratory)

FOR

NITRILE RUBBER COMPOUND

for Molded and Extruded Automotive and Aviation Parts, Heels, Soles, Mechanical Items, etc.

Barrett BARDOL* rubber softener and CUMAR* resin (P-25 Grade) are exceptionally serviceable softeners for compounding with nitrile rubber in making molded and extruded parts, heels, soles and mechanical items such as hose, gaskets, belting, etc. They improve processing properties and provide vulcanizates meeting many service requirements.

BARDOL* rubber softener is readily incorporated and is very effective in reducing the viscosity of the elastomer. It confers high elongations and reduces moduli considerably while contributing to the retention of tensile strength. The vulcanizates are characterized by high tear and abrasion resistance, good resilience and compression set, and a low volume increase after immersion in SR-6 reference fluid.

CUMAR* resin (P-25 Grade), because of its solvent power for sulfur, promotes more uniform cures and thereby improves the over-all performance of the vulcanizates. It also promotes building tack and consequently has application in the fabrication of laminated stocks.

Your inquiries are invited.

RECIPE

Nitrile Rubber	100.00
BARDOL* Rubber Softener	20.00
CUMAR* Resin (P-25 Grade)	5.00
Furnace Black (SRF)	75.00
Zinc Oxide	5.00
Stearic Acid	1.00
Sulfur	1.50
Benzothiazyl Disulfide	1.25
TOTAL	**208.75**
Specific Gravity	1.28
Mooney Viscosity (Large Rotor) 4 minutes at 212°F	48
Cure at 307°F (60 lb.): Minutes	30

Physical Properties of Vulcanizates (Unaged)

Stress—psi—300%	1450
Tensile Strength—psi	2150
Ultimate Elongation, %	580
Hardness—Shore A	56
Tear Resistance (Crescent), Pounds per one inch thickness	360
†Abrasion Resistance (duPont), cc loss per H.P. Hour	115
†Resilience (Yerzley), %	54.4
†Impact Resilience (Goodyear-Healey), %	46.9
†Compression Set (40% Constant Deflection) %	20.0
Weight Loss (4 days at 100°C), %	7.3
Volume Increase (SR-6 Reference Fluid 48 hours at room temperature), %	14.1

†Cure: 45 minutes at 307°F (60 lb.)

Barrett*

THE BARRETT DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 Rector Street, New York 6, N. Y.

In Canada: The Barrett Company, Ltd., 5551 St. Hubert Street, Montreal, Que.

*Reg. U.S. Pat. Off.

METHOCEL

is back in carload quantities!

Methocel (Dow Methylcellulose) is being successfully employed in the rubber industry as a thickening and creaming agent in rubber dispersions.

Methocel (a cold water soluble cellulose ether) is compatible with a wide range of synthetic latices and with natural latex, and further, can be easily added to these dispersions.

Methocel solutions are also very effective rubber mold release agents, where mold temperatures are not excessively high.

Methocel is available for shipment *now*. Take advantage of its unique properties. Write to Dow for more detailed information about Methocel's uses in the rubber industry.

METHOCEL ADVANTAGES

1. Methocel is compatible to an unusual degree with a wide variety of modifying agents including alcohols, wetting agents, plasticizers and resins.
2. Methocel is odorless, harmless.
3. Methocel solutions ordinarily do not require preservatives.
4. Methocel is a uniform, synthetic chemical product.
5. Methocel solutions are neutral.
6. Methocel solutions remain clear and colorless over a wide pH range.
7. Methocel is completely soluble in water.

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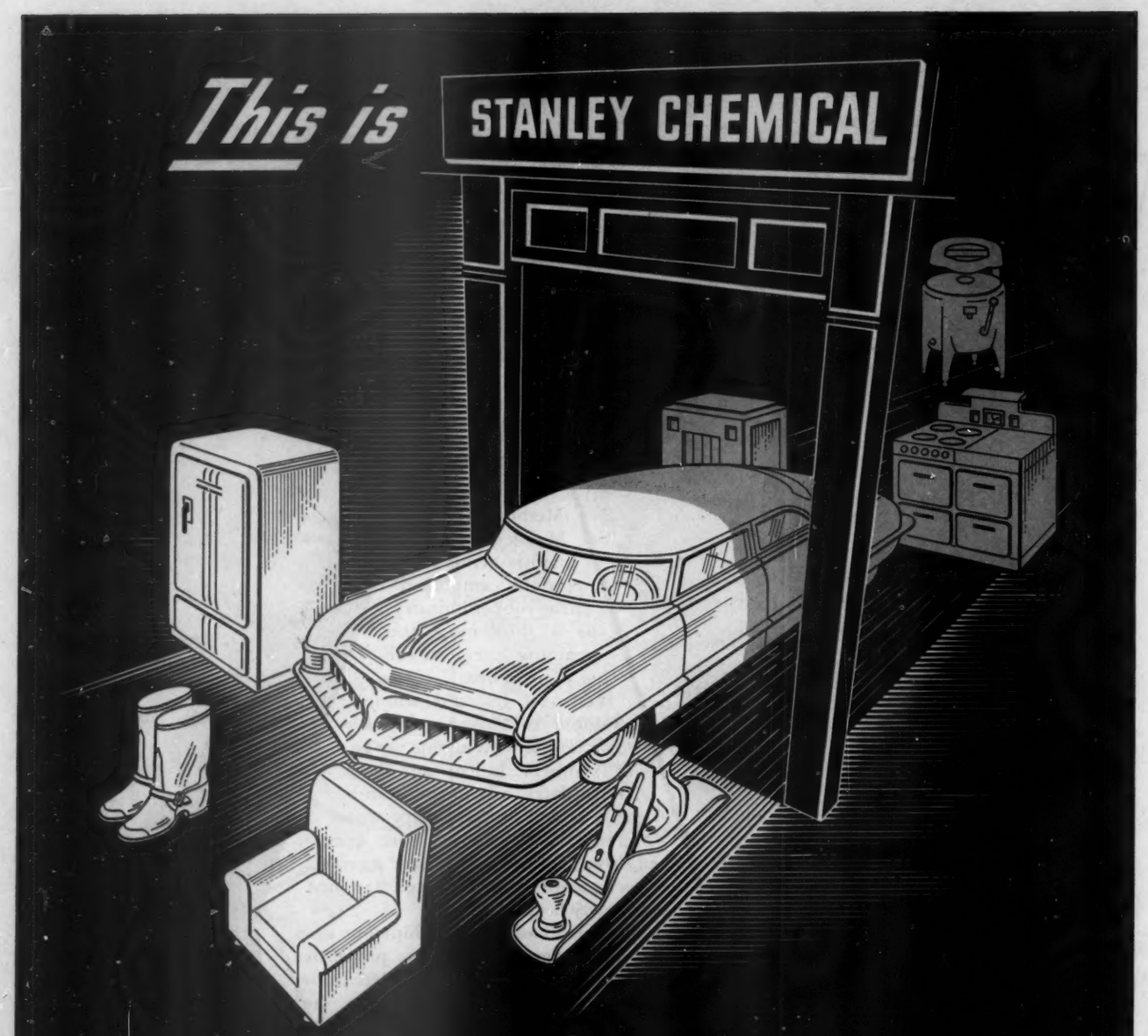
This is STANLEY CHEMICAL



AMONG THE MILLIONS of consumer and industrial products produced throughout all industries you will find that many are beautified and protected with *Finishes by Stanley*. If your product requires a finish to resist corrosion, sunlight, heat, cold, foods, dirt or aging . . . to add sales appeal or increase durability, Stanley chemists can suggest or create a coating that will solve your finishing problem. For evidence of our ability, write or wire Stanley Chemical Co., East Berlin, Conn.

STANLEY

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INDUSTRIAL COATINGS

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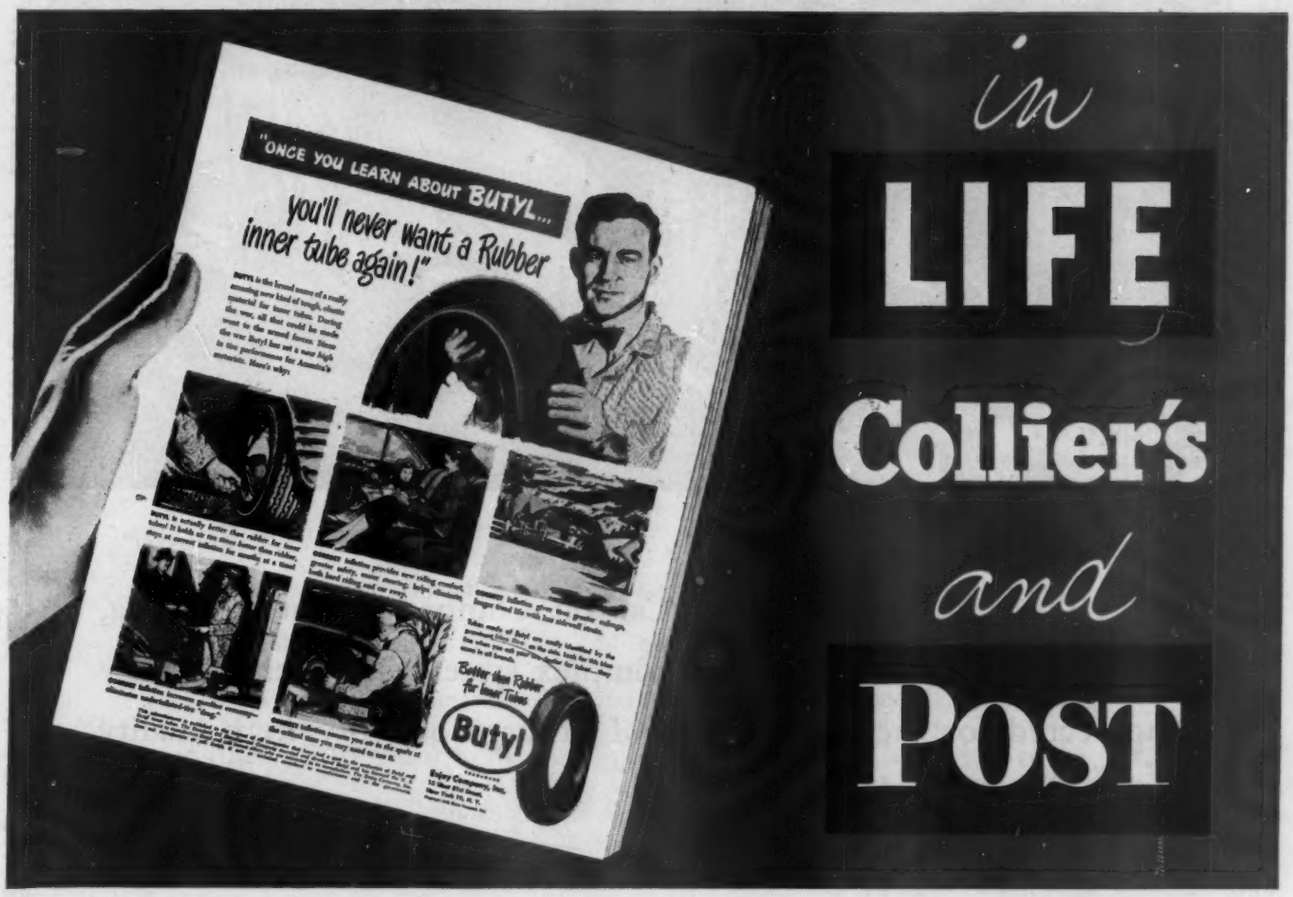
MILLIONS LEARN ABOUT BUTYL...



MANUFACTURERS AND MARKETERS have known for several years that Butyl is superior to natural rubber for inner tubes. BUT NOW... the motoring public is being told about Butyl in regularly scheduled full-page color ads in LIFE, SATURDAY EVENING POST, and COLLIER'S.

Fact-packed, strong-selling national Butyl advertising in 1948 will increase consumer demand for more of *your brand* of tubes... *if you identify them as genuine Butyls!*

The public will learn that Butyl tubes:

- **Hold air ten times better than rubber.**
- **Provide greater safety against blowouts.**
- **Give greater riding comfort.**
- **Save gasoline and tires.**

Watch for the big Butyl ads... and be sure to cash in on the FACTS ABOUT BUTYL with your dealers and their customers. For more information about Butyl, and Butyl inner tubes, write:

Butyl

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ENJAY COMPANY, INC.
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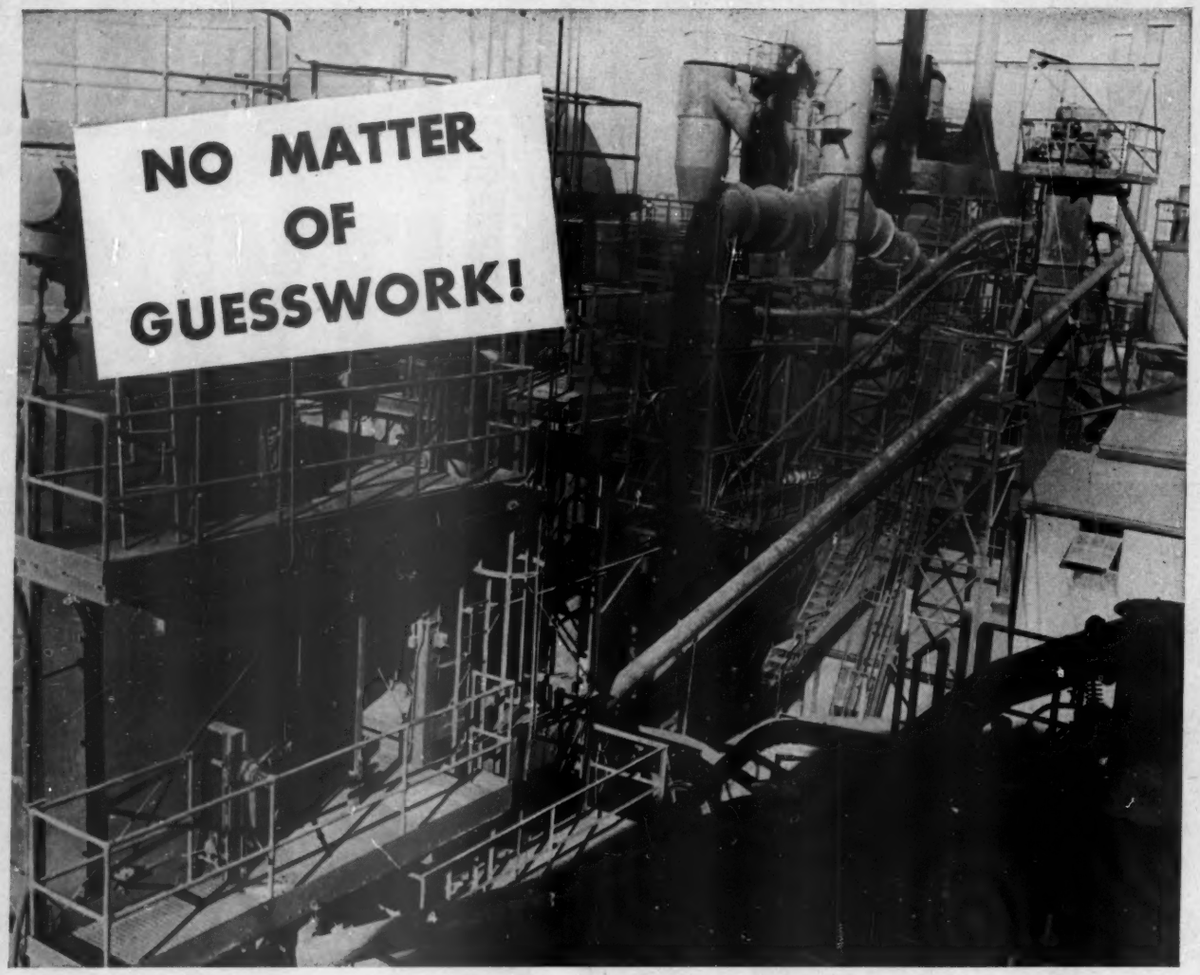
• PELLETEX • GASTEX • PELLETEX • GASTEX • PELLETEX • GASTEX • PELLETEX • GASTEX • PELLETEX • GASTEX • PELLETEX •



SECTION of General Atlas Carbon Company plant at Pampa, Texas. Every detail of this complex system has been carefully engineered for the precise control of large quantity, high quality carbon black production.

GASTEX

Herron Bros. & Meyer Inc., New York and Akron
Herron & Meyer of Chicago, Chicago
Raw Materials Company, Boston

GENERAL ATLAS CARBON CO.
PAMPA, TEXAS • GUYMON, OKLA.

PELLETEX

H. N. Richards Company, Trenton
The B. E. Dougherty Company, Los Angeles & San Francisco
Harrisons & Crosfield (Canada), Ltd. Toronto and Montreal

• PELLETEX • GASTEX • PELLETEX • GASTEX • PELLETEX • CABOT • PELLETEX • GASTEX • PELLETEX • GASTEX • PELLETEX •

Authoritative, On-The-Spot Reports From Every Part of the World On Current Developments In Rubber

This is a monthly service for those firms who wish to keep completely informed of current developments in the rubber commodity field. It supplies facts, opinions and forecasts from Washington and every rubber producing area in the world. Air-mail dispatches from London, Paris, Amsterdam, Malaya and the Far East. It obtains authoritative original opinions from leading rubber experts on subjects of current importance. It analyzes legislative trends and government policy developments in Washington. It summarizes the "business climate" each month. "RUBBER REPORT" is edited by Warren S. Lockwood and H. C. Bugbee. It is the most quoted and authoritative review of the month-to-month rubber situation available. Mailed to subscribers in the U. S. and twenty overseas countries on the 15th of every month from W. S. Lockwood, Inc., 1631 K Street, N. W., Washington 6, D. C.

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$300. Per Year

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talk about takeups...

IOI's newest constant tension continuous extrusion takeup for plastic or rubber

These features speak for themselves!

- Demountable alloy reel shaft and lever operated tilting base simplify reel loading and unloading
- Unloads reels direct to floor with no possibility of damaging flanges on even heaviest reels
- Shifts automatically or manually from full to empty reel without interrupting the winding process
- Hydraulic reel synchronizer effects continuous precision control of reel speed in proportion to winding diameter
- Uses either hydraulic or pneumatic constant tension reel drive
- Traverse and crossover are stroke and lay adjustable through a wide lay range
- Wide operating speed range available, up to 2,000 FPM or higher
- Adaptable to any type of tuber drive—hydraulic, mechanical, electrical or electronic.

For complete information on this machine as well as other IOI developments in continuous extrusion takeup equipment write for "Blueprint for Industry," Part IV. It's free for the asking.

INDUSTRIAL OVENS, INC.

IOI ENGINEERING VERSATILITY

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ASSOCIATED COMPANY: JAMES' DAY MACHINERY LTD., LONDON W. I, ENGLAND

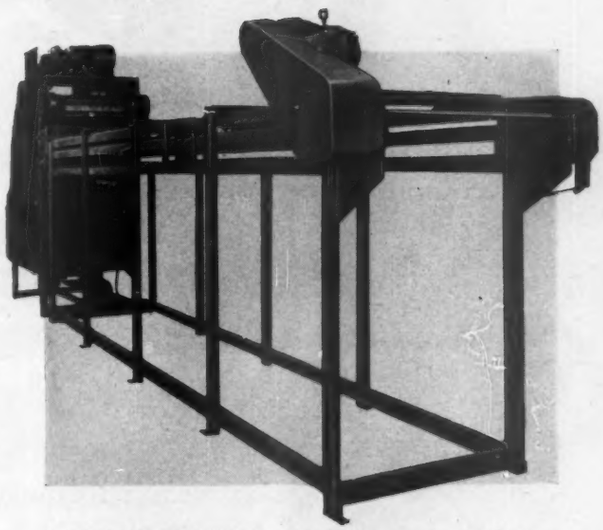
Cut your Banbury Cycle Time...

with this

AKRON-STANDARD AUTOMATIC MILL BATCH-OFF MACHINE

MILL END. *The Akron-Standard automatic batch-off machine ready to receive milled stock.*

Designed primarily to handle the mill output in connection with Banbury dump mills, this proven Akron-Standard machine distinctly shortens your Banbury cycle. It saves valuable mixing time by removing a continuous slab of stock from the mill in two minutes or less—*in a mere fraction of the time* you have heretofore needed to slab off the processed stock by hand. Your procssing cycle is reduced, your stock-handling definitely speeded up. How can you possibly afford to be without this remarkable ime-saving Akron-Standard equipment?



BATCH-OFF END. *Rack loading end and festoon rack in position to receive milled slab.*

Ask for our well illustrated 36-page Bulletin "A", describing this and many other types of profit-making Akron-Standard equipment.

The Akron Standard Mold Co.

1624 Englewood Avenue — *"The Established Measure of Value"* — Akron 5, Ohio, U. S. A.

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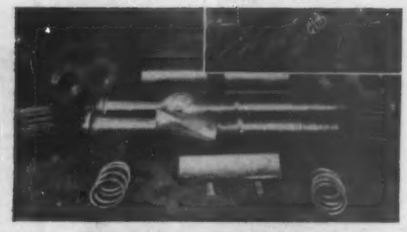
IMPORTANT

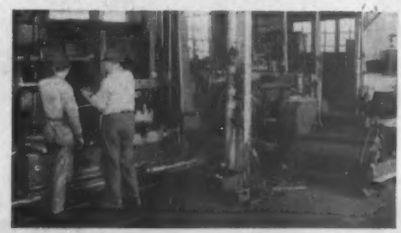
Maybe About Your

Banbury Mixers



INTERSTATE has available for immediate shipment to you many spare parts for all sizes of Banbury Mixers.

INTERSTATE has ready for quick interchange with you *completely rebuilt* #9 Banbury Bodies, spray or jacketed.



INTERSTATE men are on top of every Banbury problem through 14 years first-hand, concentrated experience with all sizes; rebuilding, repairing, and installing — in large and small Plants the country over. WE ARE SPECIALISTS, thoroughly equipped.

INTERSTATE rebuilding restores correct contours to rotors and mixing chamber, and includes our exclusive hard-surfacing process which adds amazing abrasion resistance, and our specially fabricated and guaranteed rings, made to standard dimensions.

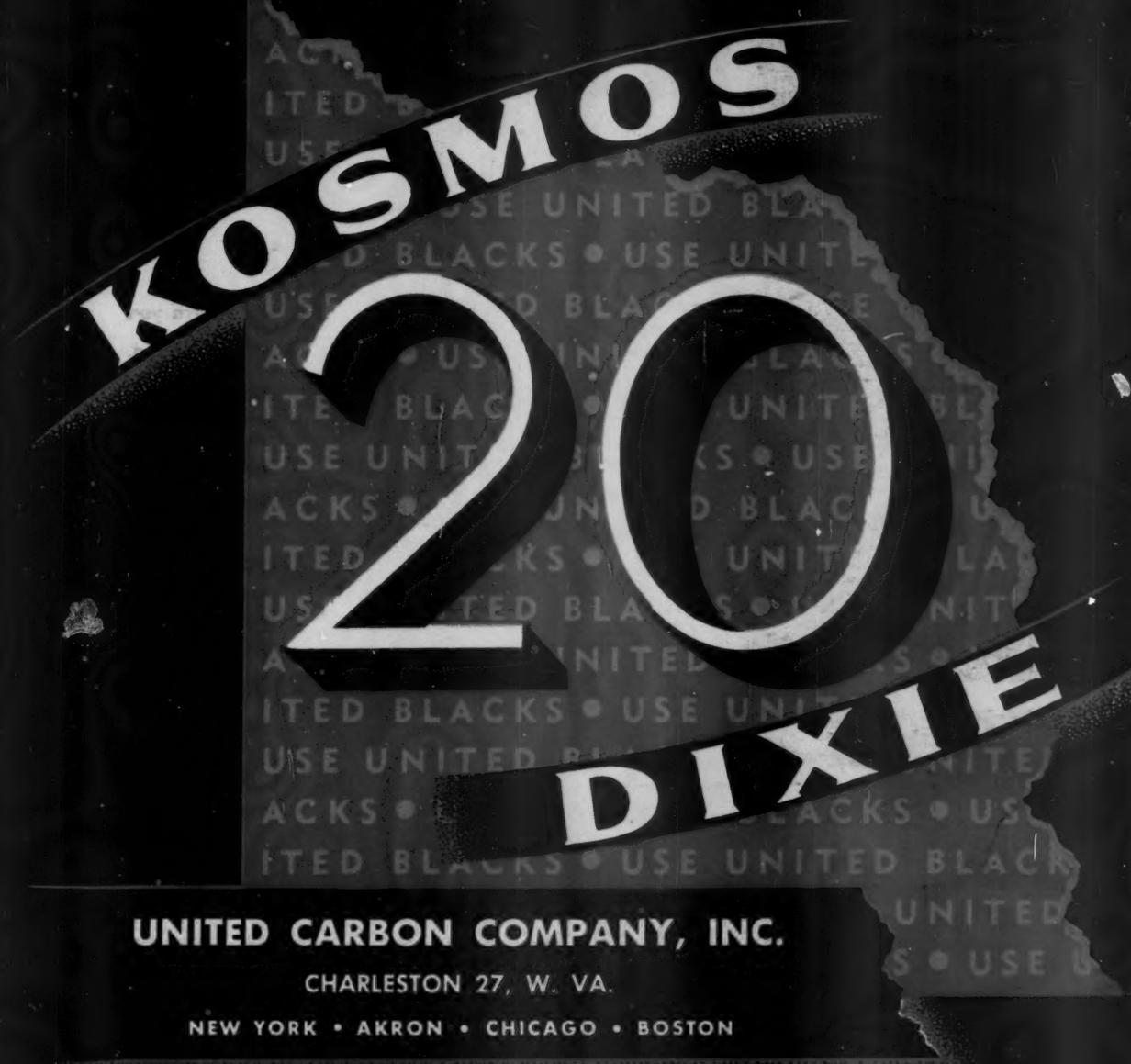
YOU KNOW that a work-worn, lagging, and leaky Banbury loses materials, loses time, loses production, loses quality. If you would rather not have such losses — call or write us for fast, efficient help.

SERVING THE RUBBER INDUSTRY

INTERSTATE WELDING SERVICE

Main Plant 914 Miami Street AKRON 11, OHIO Phone JE 7970

EXCLUSIVE SPECIALISTS IN BANBURY MIXER REBUILDING



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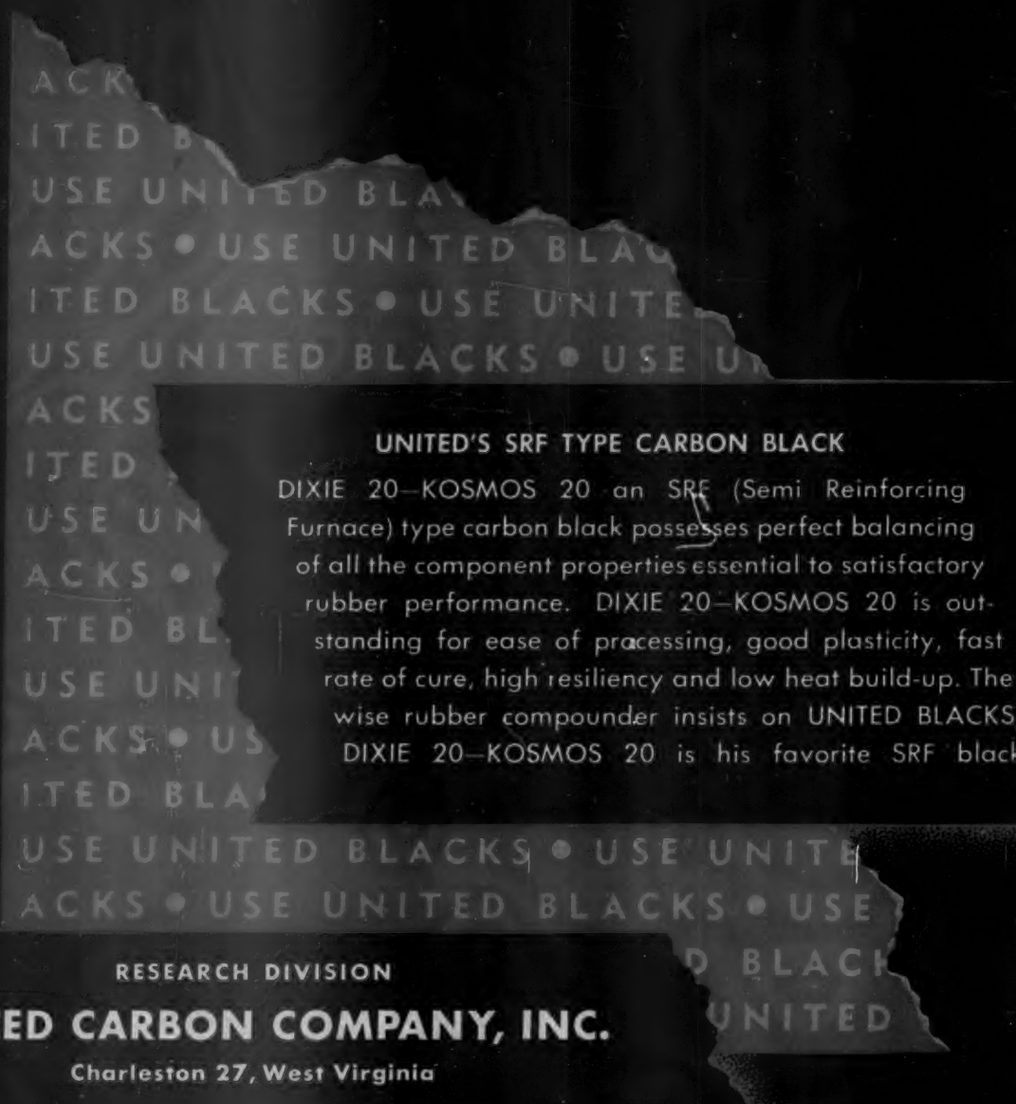
NEW YORK • AKRON • CHICAGO • BOSTON



UNITED'S SRF TYPE CARBON BLACK

DIXIE 20—KOSMOS 20 an SRF (Semi Reinforcing Furnace) type carbon black possesses perfect balancing of all the component properties essential to satisfactory rubber performance. DIXIE 20—KOSMOS 20 is outstanding for ease of processing, good plasticity, fast rate of cure, high resiliency and low heat build-up. The wise rubber compounder insists on UNITED BLACKS; DIXIE 20—KOSMOS 20 is his favorite SRF black.

RESEARCH DIVISION

UNITED CARBON COMPANY, INC.

Charleston 27, West Virginia

• PLASTICIZER SC is widely used in both rubber and synthetic resin compounding for high plasticizing action . . . It provides exceptionally desirable properties in countless finished products . . . Its application in compounds of various types makes it one of the most versatile of plasticizers — as well as the most effective in providing high plasticity quickly. It improves processing of stocks and cuts time on production . . .

PLASTICIZER SC is stable at high temperatures, and no volatilization or decomposition occurs on working at high operating temperatures . . . It is recommended for a wide range of products, including embossed surface products, soles and heels, fabric coatings, wire and cable insulation, tubing, unsupported films and aqueous dispersions.

Write for complete data and sample.

Manufactured by
E.F. DREW & CO. INC.

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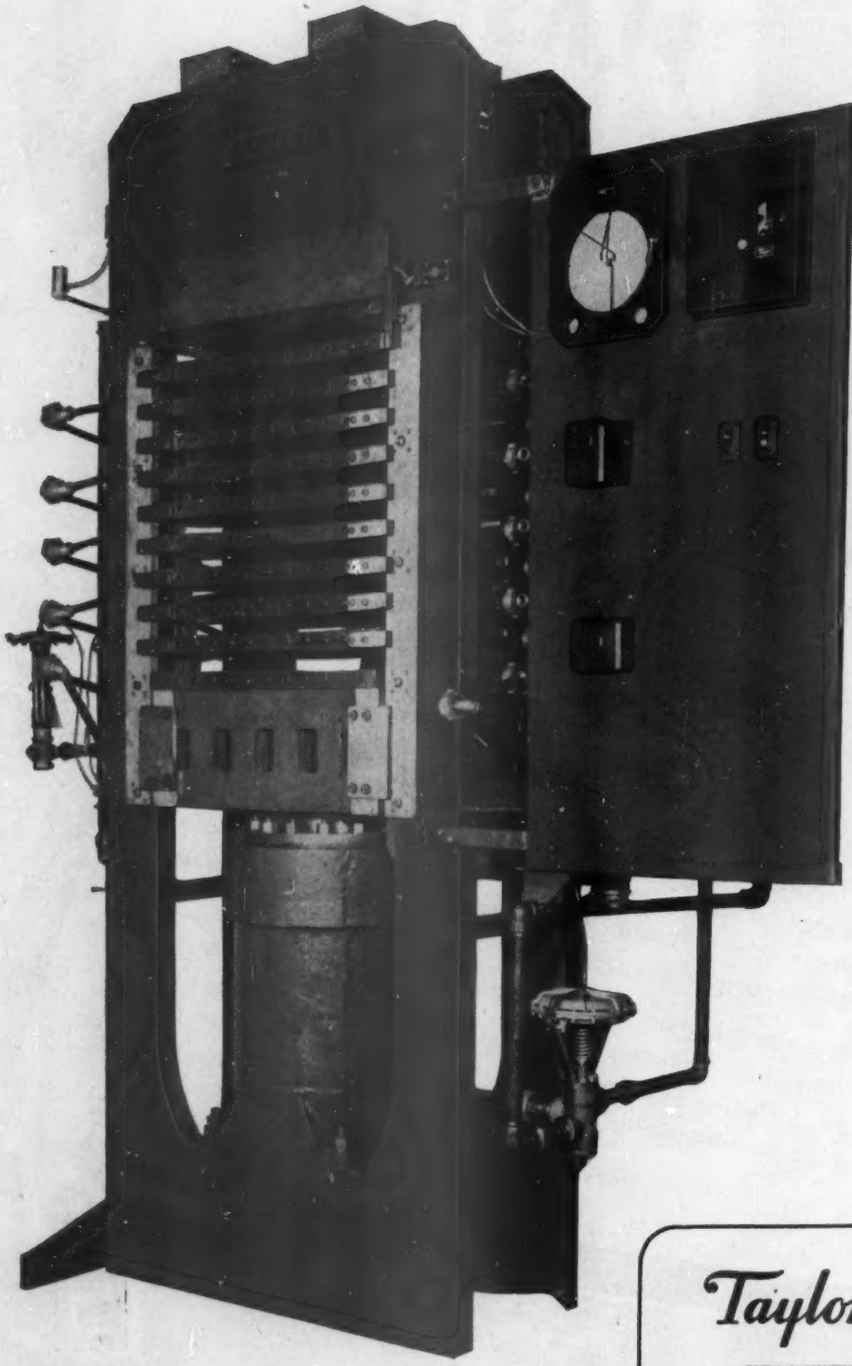
AKRON 8, OHIO
Branches: Boston . . . Trenton . . . Chicago . . . Los Angeles

HOW AUTOMATIC CONTROL SAVES 9 STEPS IN PLATEN PRESS MOLDING



HERE you see a new "EEMCO" heavy-duty hydraulic press, built by the Erie Engine and Mfg. Company at Erie, Pa. Those Taylor Instruments on the panel attached to it are there to save you these *nine vital operating steps!* Here's what happens:

1. Fulscope Controller (upper left) records and controls outlet press temperature by throttling steam inlet valve.

2. Repeating Cycle Timer (left center) operates condensate discharge valve periodically and automatically.

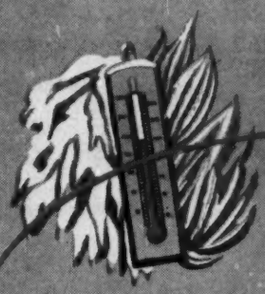
And then the **Flex-O-Timer** automatically handles these seven steps:

1. Closes press.
2. Supplies air to Fulscope which then turns steam on. Also supplies air to Repeating Cycle Timer.
3. Cooling water is off and discharge valve is in position to close water to drain and open condensate return.
4. Master Timer stops and cuts in Auxiliary Timer to time the cure.
5. At end of cure, Auxiliary Timer stops, Master Timer restarts, air is shut off to Temperature Controller and Repeating Cycle Timer, shutting off steam supply. Master Timer also repositions three-way valve in outlet to close condensate return and open water-to-drain connection. Also turns on cooling water.
6. At end of cooling, Flex-O-Timer turns off water, reverses position of three-way valve in outlet, ready for next cycle.
7. Press opens and Flex-O-Timer stops.

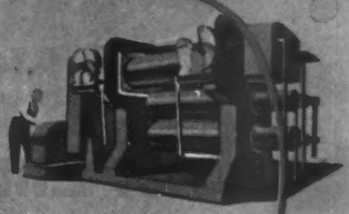
TOTAL: 9 steps—**the whole curing process**—controlled automatically without a single chance of human error! Another reason why we say, "When ordering processing equipment, specify Taylor equipped as usual." Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada.

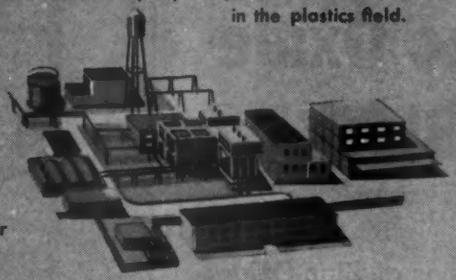
Instruments for indicating, recording and controlling temperature, pressure, humidity, flow and liquid level.

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY



MODERN PLANT!
New Marvinol plant, now in production, contains latest equipment to assure efficient operation, uniform product. No division of The Glenn L. Martin Company compounds or fabricates in the plastics field.

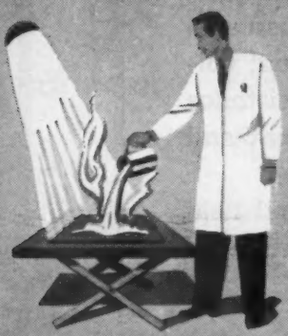




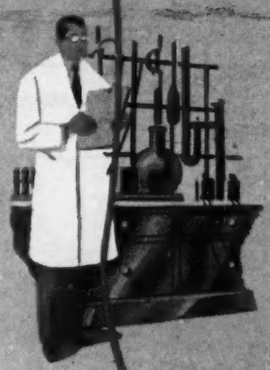
WIDE TEMPERATURE RANGE!
Products made from Marvinol resins show less heat deformation than other resins . . . offer positive advantages in low temperature flexibility.

UNUSUAL VERSATILITY!
Easy to process, Marvinol resin may be calendered, extruded, injection molded, used in non-aqueous dispersions, formulated as unplasticized rigids.

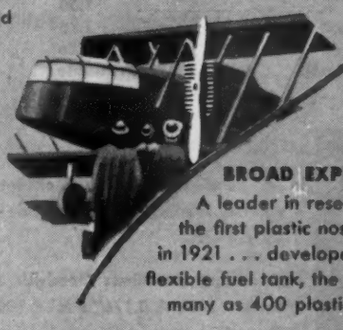
these unique advantages make **MARVINOL® RESINS** *a must!*



TECHNICAL COOPERATION!
Expert sales engineers and fully-equipped customer service laboratory are available. Write on your company letterhead to: Chemicals Division, The Glenn L. Martin Co., Baltimore 3, Maryland.



UNSURPASSED STABILITY!
A polyvinyl chloride-type resin, of high molecular weight, Marvinol offers superior resistance to heat, light and other normally destructive factors.



MANY OTHER ADVANTAGES!
Unusual "dryness" . . . exceptional toughness and long life . . . may be tasteless, odorless . . . easily, quickly cleaned . . . can give crystal-clear transparency, brilliant or delicate colors.

BROAD EXPERIENCE!
A leader in research, Martin introduced the first plastic nose section for aircraft in 1921 . . . developed the first leak-proof flexible fuel tank, the Mareng cell . . . used as many as 400 plastic parts in one plane.

Martin ® Marvinol

RESINS, PLASTICIZERS AND STABILIZERS PRODUCED BY THE CHEMICALS DIVISION OF

THE GLENN L. MARTIN COMPANY • AN INTERNATIONAL INSTITUTION

"BETTER PRODUCTS, GREATER PROGRESS, ARE MADE BY MARTIN"

Technical Bulletin No. 43

Natural Rubber with Blends of Zinc Oxide and HMF Black

(Low Abrasion Type)

IT will be recalled that blends of Zinc Oxide and Channel Black did not follow the mixture law too well with respect to stress-strain properties. However, the present tests show that with HMF Black, tensile strength follows the mixture law quite closely. The modulus drops with increasing additions of Zinc Oxide, in a straight-line relationship until the Black and Zinc Oxide are at approximately equal volume loadings, and then levels off, as does the Shore hardness. The elongation increases with additions of Zinc Oxide to the equal volume loading and then levels off. Tear resistance drops slightly to the equal volume point and then increases.

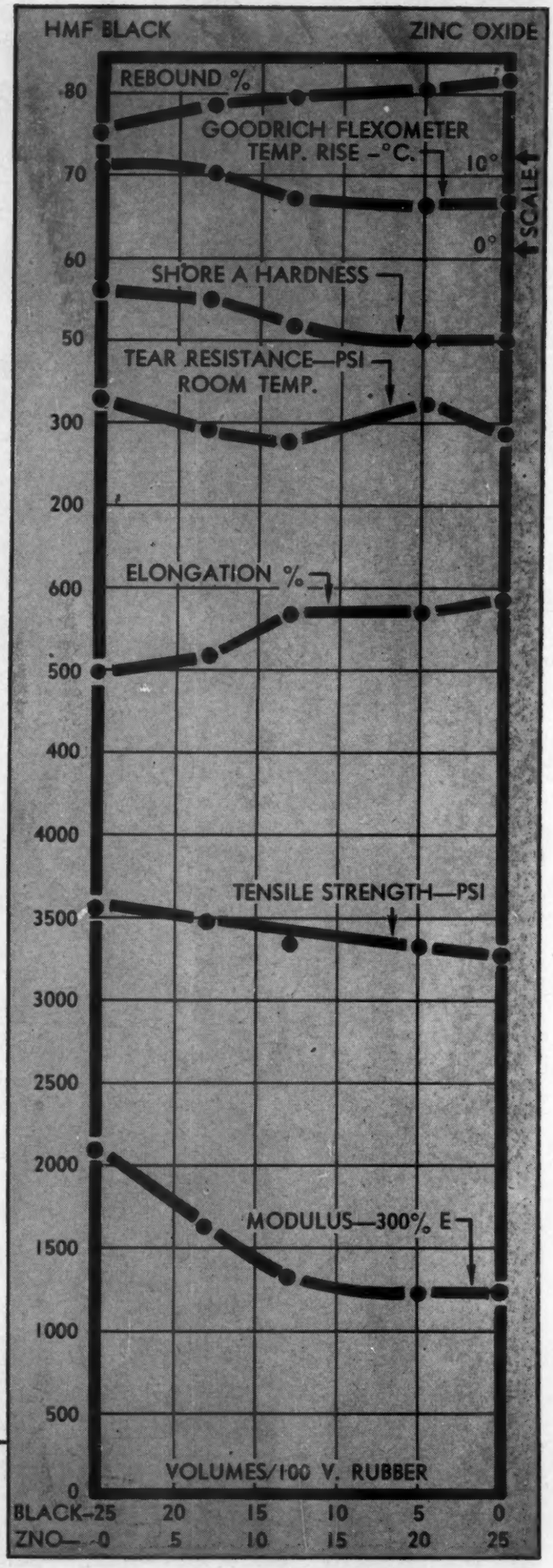
The pendulum rebound increases and heat generation decreases with each addition of Zinc Oxide.

COMPOUND NO. 43

Smoked Sheet	100.00
Sulfur	3.38
"Altax"	0.80
Stearic Acid	1.50
"Thermoflex A"	1.25
Zinc Oxide	Variable
HMF Carbon Black	Variable

All cures at 30"/274°F. except 25 volume loading of Zinc Oxide — at 45"/274°F.

Operating conditions Goodrich Flexometer: 143 psi, 0.175" Stroke, 100° C. Oven Temperature.



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DETERIORATION
FLEX CRACKING
OXYGEN AGING

POLYDIARYLAMINES

PRICE SCHEDULE

100 to 1,999 lbs.	$0.42 per lb.
2,000 to 9,999 lbs.	0.40 per lb.
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30,000 to 99,999 lbs.	0.38 per lb.
100,000 lbs. up	0.37 per lb.

Add 1c per lb. for West Coast

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For Export, prices are F.A.S. Atlantic Ports

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and For Premium Performance
Per Dollar Always Specify PDA-10

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1—UTILITY—A general purpose antioxidant sufficiently versatile to efficiently and effectively meet the requirements of the industry.

2—QUALITY—A product of uniformly good quality capable of delivering top performance.

3—PRICE—A price schedule designed to maintain aggressive competition.

1—RESEARCH REPORT NUMBER ONE, now available, is a comparative evaluation of commercial antioxidants to demonstrate UTILITY.

2—The strict control exercised in the production of PDA-10 insures the highest uniformity of QUALITY.

3—PDA-10 continues to set the pace in performance and in PRICE.

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AS CLEAN AS ...A WHISTLE

RUBBER-FLO is SAFE! It is a non-toxic odorless mold lubricant.

RUBBER-FLO is QUICK! It may be sprayed, brushed or dripped onto the mold. It will not clog a spray gun.

RUBBER-FLO is ECONOMICAL! The savings in maintenance more than pay for it.

RUBBER-FLO is LOW IN COST! It comes in concentrated form and is diluted with water for use.

Rubber manufacturers of diverse lines, such as Mechanical Rubber Goods, Soles and Heels, Sponge Rubber Products, Drug Sundries, Tires and Tubes have found that RUBBER-FLO MOLD LUBRICANT increases production and reduces maintenance.

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YOU GET A DOUBLE BONUS

. . . with pellet rubber

ADVANTAGES OF PELLET RUBBER SYSTEM

1. Uniformity and quality of finished product improved.
2. Extra working in pelletizer increases plasticity and gives better dispersion.
3. Banbury mixing cycle reduced—production increased.
4. Automatic conveying, weighing and mixing cuts handling and storage costs.
5. Less floor space required—floor storage and trucking eliminated.
6. Cleaner mill room—dust eliminated because pellet handling system completely sealed in.
7. Pellets thoroughly and quickly cooled—shorter time between processing operations—less stock in process.

* The Hale pelletizer is an extruding machine in which the screw forces the rubber up to the pelletizer head where the pellets are formed. The pellets are lightly coated, before leaving the machine, with a soapstone solution which prevents their sticking together.

Designed to transform bulky, hard-to-handle rubber into small, free-flowing pellets, the Hale pelletizer provides, in addition, a double bonus.

Exhaustive laboratory tests, confirmed by the experience of users, show that the extra working which the stock receives in passing through the pelletizer *improves the plasticity* and gives *better dispersion* of the various ingredients.

If you are interested in improving uniformity and quality of your finished product, while, at the same time, cutting your handling costs, send for complete information about the Hale pelletizer and the pellet rubber system. Write today—no obligation. FB-436

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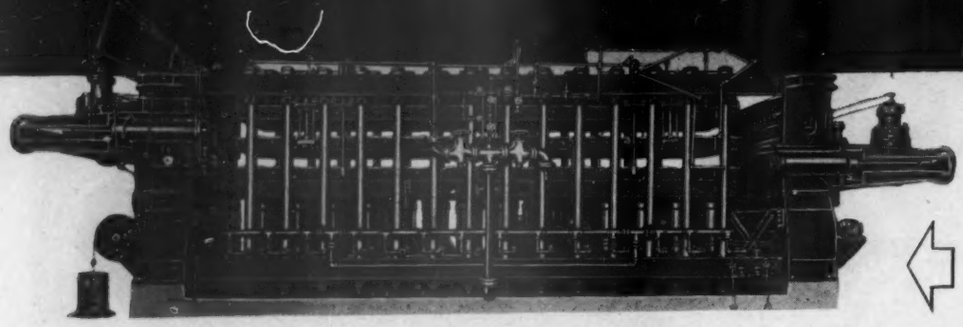
Farrel-Birmingham

ADAMSON UNITED HYDRAULIC PRESSES

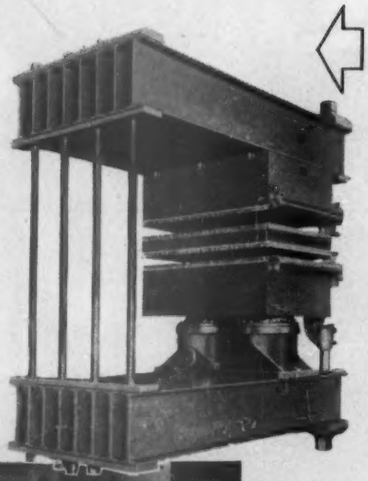


TWO-OPENING

This press has two openings permitting two lengths of belting up to 60 inches in width running in opposite directions, to be cured simultaneously. It is equipped with polished platens 63 inches wide by 31 feet long. Twenty-eight rams provide pressure during the curing operation. Proper belt tension is maintained by

FLOOR COVERING PRESS

A three-opening 42" x 126" Rod-type Press with three 22" hydraulic rams. The head, platens and bolsters are continuous the full length of the press. Just the press for your floor tile and runners. Flooring may be cured in molds, or between flat, sandwich plates. A prime characteristic of this press is its versatility. Addition of stretchers makes it adaptable to belt curing,—or, cut apart, it becomes three separate 42" square presses.



OPEN-SIDE BELT PRESS

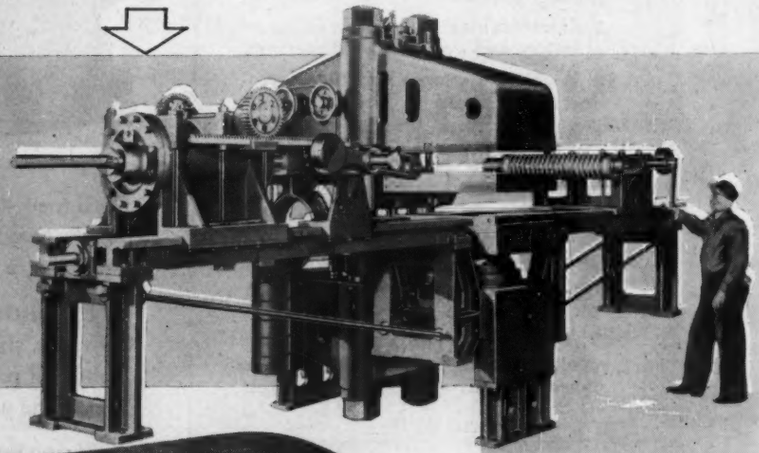
Through the use of structural beams for the head and base, with strain rods, this heavy-duty unit is desirable for the larger, more powerful open-side presses. Cold ends are built into 50" x 42" platens. The intermediate platens are held horizontal by four heavy guides traveling on turned and ground strain rods. The press is powered by two 20" rams. Excellent for curing "V" and flat belts.

One of the most important uses of the Press is the curing of endless belts. Endless belts can be put into and taken out of the Press very easily.

30" x 36" OPEN-SIDE BELT CURING PRESS FOR FLAT OR V-BELTS

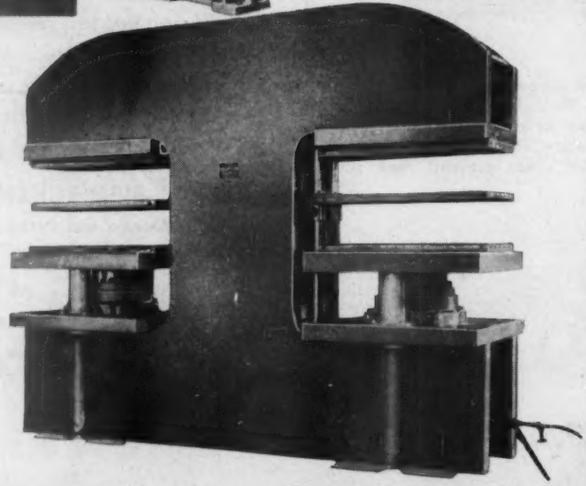
Complete with adjustable hydraulic stretcher, this press was designed and built for one of the industry's largest belt manufacturers. All platens are equipped with built-in cold ends. Intermediate platen with counterweights, is accurately suspended and guided on ground strain rods. Overhead push-back is provided for intermediate platens and bolster. Platens are chromium plated for flat belt curing.

Stretcher rolls are made up of steel cores and shells of aluminum grooved to the proper contour for the belts involved. Aluminum roller shells are interchangeable.



DUPLEX PRESS FOR CURING "V" TRANSMISSION BELTS

The flat belts cured on this type of press are used in all kinds of agricultural machinery and wherever flat pulleys must be driven. It is a rugged, easily accessible, economical press with fabricated steel plate housing. It is equipped with spring-loaded pull-backs for the bolster. Intermediate platen is suspended in a manner that assures operator perfect parallelism of top and bottom platens. This press is indicated where pressures are comparatively low, and is ideal for curing "V" belts, etc. Manually or hydraulically operated belt stretcher equipment is available.



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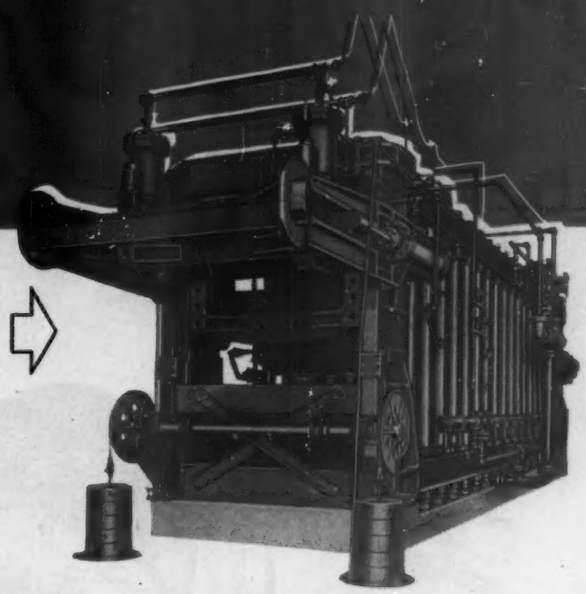
FOR ENDLESS FLAT BELTS AND ENDLESS V-BELTS

Our latest catalog of Hydraulic Presses for the Rubber, Plastics and Plywood industries, is ready for distribution. It describes and illustrates many types of Presses not shown in this advertisement. Send for it. You'll find it interesting.

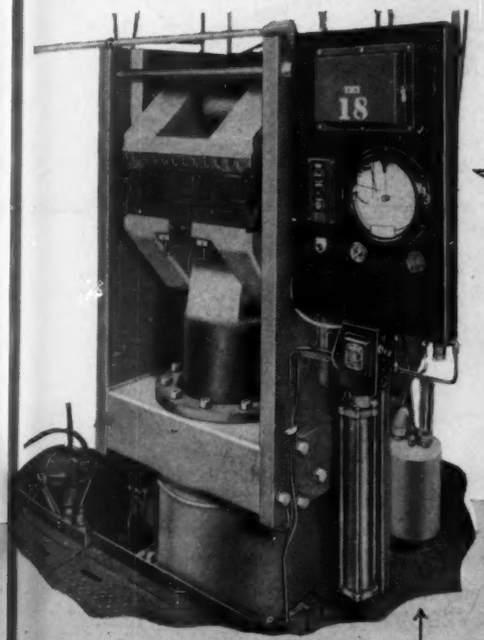
BELT CURING PRESS



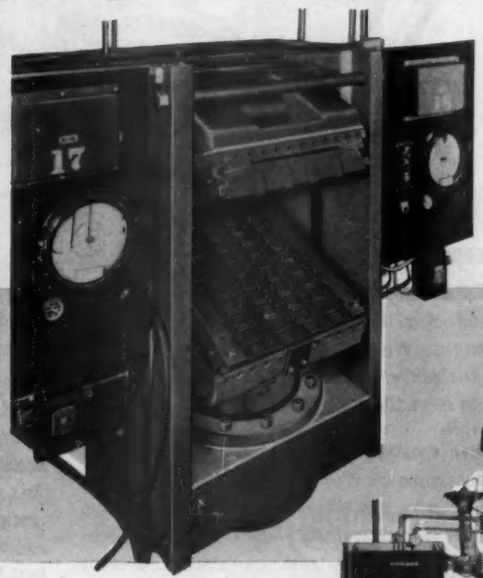
means of a clamp at one end and a stretcher at the other. These are mounted on separate stands rigidly braced by heavy compression members which extend the full length of the press. The clamp holds the belt while the stretcher is hydraulically pushed away from the press to give the belt the required stretch.

An exclusive Adamson United feature is the means of raising and lowering the stretcher clamps to maintain exact alignment of the press platen surface with the adjustment clamp surfaces. This mechanical method, much superior to hydraulic synchronization, causes the clamps and stretchers to move in perfect unison with the platen, eliminating entirely the possibility of the belt bending over the edges of the platen ends during the curing process. Press can be built with one or two openings in any size, for any platen pressure.

ALL HYDRAULIC TILTING-HEAD PRESS



Ram raised . . . molds closed

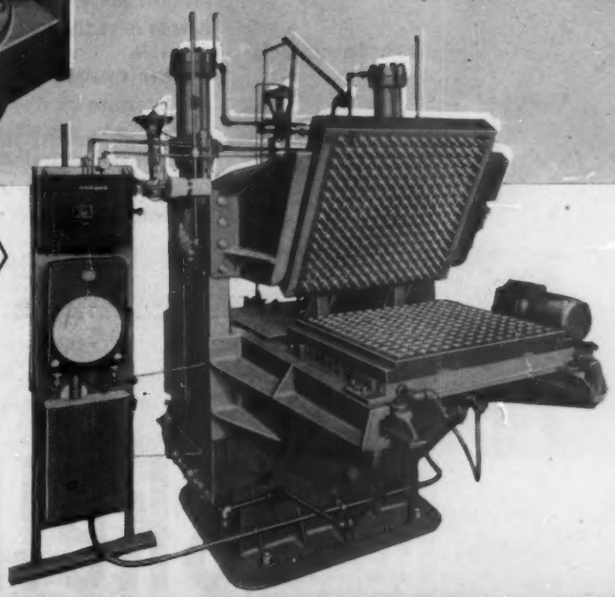


Molds in loading position

Note the accessibility of this press compared with outmoded conventional types. It is simple and rugged, with 24" x 24" platens fastened to a tilting head and a tilting bolster. The platens remain parallel during the first part of the down stroke of the ram, then tilt open during the remainder of the down stroke. Unlike the Automatic Press, the molds never emerge from the Press. Toggles for opening and closing the molds have been eliminated.

The right amount of pressure per square inch on the platens is maintained hydraulically. Wear or variable platen pressures are eliminated.

SINGLE OPENING AUTOMATIC PRESS



Fully automatic, yet possessing all the advantages of the conventional press for precision molding, this new type automatic, in many instances, has stepped up production as much as 50%.

Operation is extremely simple, with practically all manual effort eliminated. There is no more tugging or handling of heavy molds in and out of the Press. The operator has only to remove the cured articles and replace them with uncured rubber, press a button and the molds recede into the Press and close. A time cycle device opens the Press at the end of the cure and the molds open and move out of the Press and stop in a tilted position, from which the operator can easily strip the cured articles and repeat the process.

Single or double opening Presses can be furnished in this style, to take molds from 32" x 32" to 42" x 42"

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Plan now to have a talk with the man who *knows* solvents — a SKELLYSOLVE Technical Fieldman. He represents a company that *knows* how to serve you with dependable, high-quality solvents—Skelly Oil Company. Write us today.

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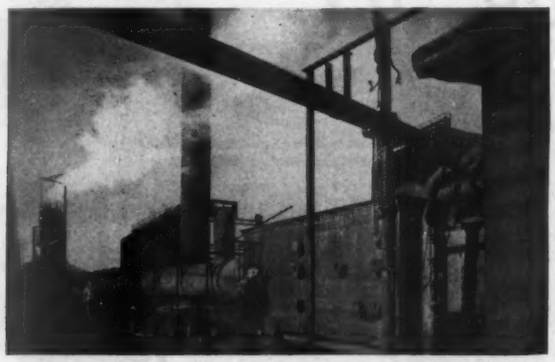
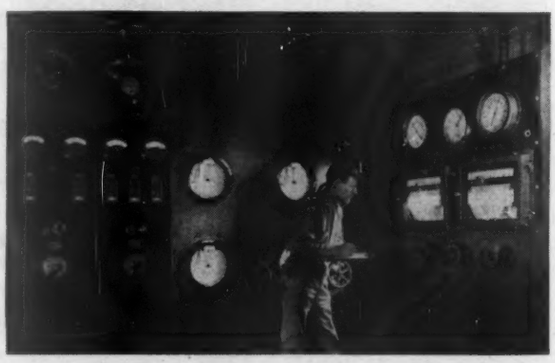


2. PRODUCTION CONTROL At one of the world's largest carbon plants . . . Continental Carbon Company, Sunray, Texas . . . the modern control center shown here, in conjunction with the completely equipped control laboratory also located at Sunray, insures a complete checking of quality.



3. AND NOW...RAW MATERIAL CONTROL Announcing the formation of Witco Hydrocarbon Corporation for the production of natural gas (as well as gasoline, butane, and propane). Witco now has complete control of Witco blacks . . . from raw material to delivery.

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The Story of an American Raw Material

by **JOHN M. BALL**

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CONTENTS

1. Early History
2. Mitchell and the Acid Process
3. Marks and the Alkali Process
4. Miscellaneous Reclaiming Processes
5. Companies and Associations
6. Scrap Rubber
7. Manufacture
8. Properties and Uses
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Epilogue: What of the Future?
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Index

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Santocure is available for immediate shipment in any quantity. For detailed information and samples, write to MONSANTO CHEMICAL COMPANY, Rubber Service Department, Second National Building, Akron 8, Ohio. Use the convenient coupon if you prefer.

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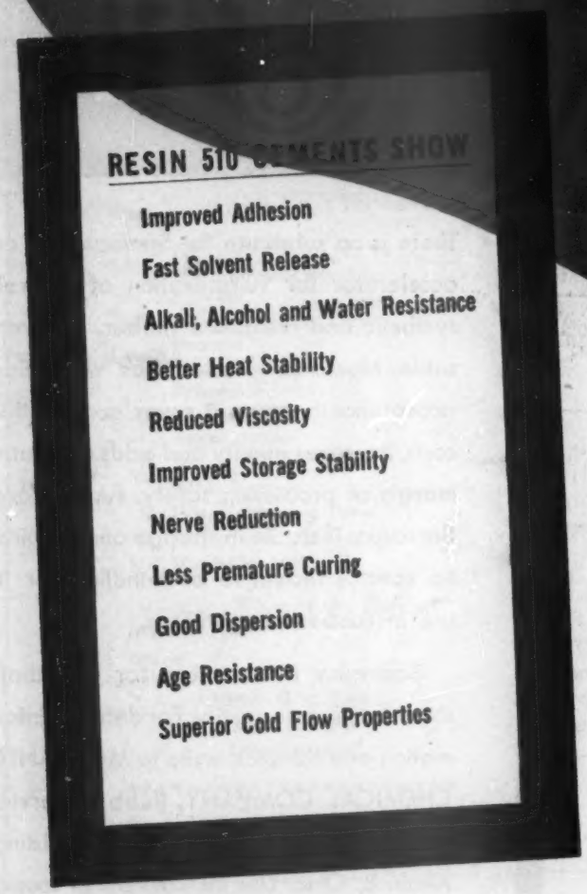

R-B-H Resin 510—a purified fossil resin —sc[illegible]ng aid, increasing the solubility of synthetic rubbers. *Milling time is reduced or eliminated in the manufacture of cements.* Important performance qualities are provided by this new, inexpensive processing aid.

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R-B-H *Dispersions*

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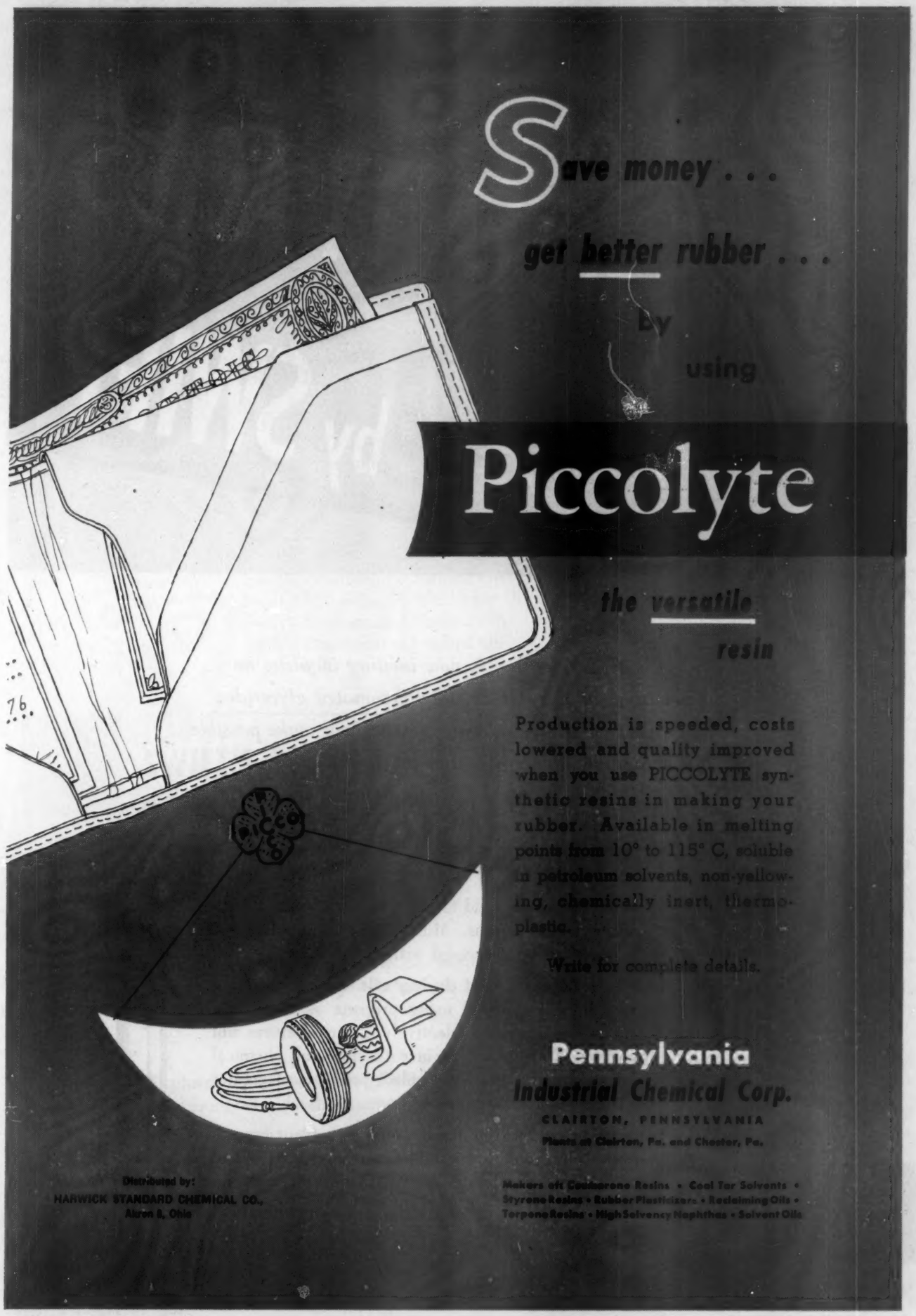
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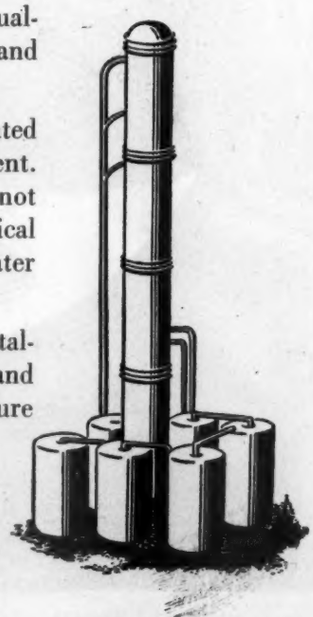

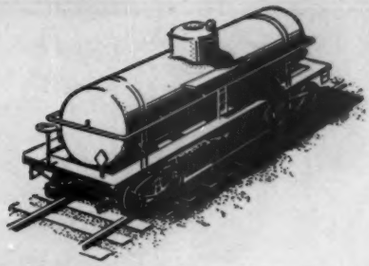

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CONTENTS FOR APRIL, 1948

Chemical and Physical Properties of Philblack Carbons — *By L. R. Sperberg and H. M. Barton* 45

Stain Test for White or Light Colored Rubber— *By Elmore J. Baruth* 52

Compressed Air in the Manufacture of Tires and Tubes 53

Uskon Radiant Heating Panels 56

Safety in Mechanical Goods Curing—*By J. E. Lovas* 57

High Polymer Forum at Chicago, Ill., Meeting Will Feature Twenty-Three Technical Papers 60

An Index to Vol. 62 of RUBBER AGE will be found on Pages 124 to 127 of this issue.

REGULAR DEPARTMENTS

Book Reviews	100	Coming Events	74
New Equipment	94	Obituaries	88
Editorials	65	Los Angeles News	90
Financial News	84	Rubber, Cotton Markets	108
Names in the News	80	Current Market Prices	110
Canadian News	92	Classified Ads	120

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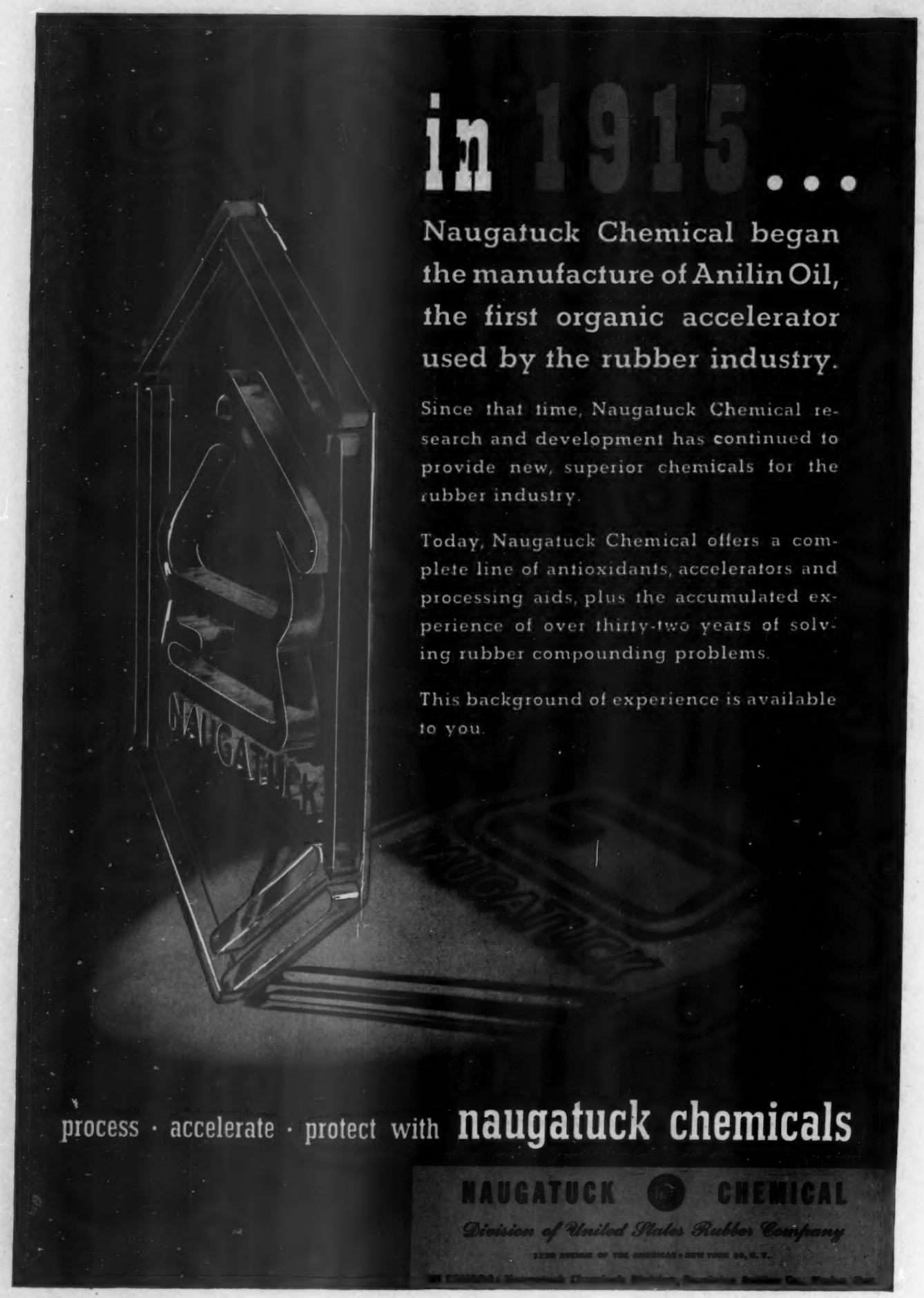
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RUBBER AGE

Vol. 63, No. 1 APRIL, 1948

Chemical and Physical Properties of PHILBLACK CARBONS

By L. R. SPERBERG and H. M. BARTON

Research Department, Phillips Petroleum Co., Bartlesville, Oklahoma

The physical and chemical properties of Philblack O and Philblack A are compared with other representative types of blacks selected from the carbon spectrum. Particle size measurements and surface area determinations are particularly significant in helping to characterize new blacks. Other information which must be considered pertinent in an explanation of performance of such carbon blacks in rubber reinforcement has been developed from studies of surface tension increase, surface activity, heat of wetting, pH, oil adsorption, diphenylguanidine adsorption, acid adsorption, color, tint, gravity, grit content, volatile matter and crystal structure.

Philblack O is a high abrasion furnace (HAF) black with small particle size and high surface area. In some tire service tests it has shown a rubber reinforcement level in terms of abrasion resistance of from 110 to 120 per cent of easy processing channel (EPC) black. Philblack A is a high modulus furnace (HMF) black with somewhat larger particle size. Its reinforcement level as determined from extensive service tests varies between 80 and 100 per cent of that of EPC black. The Philblack carbons show a higher degree of "structure" than all the other blacks, except acetylene black, when examined by an oil adsorption test.

DURING the past few years the carbon black industry has been very active in research and development work on new processes for producing carbon black having enhanced physical properties. The most marked development has been in furnace blacks which exhibit the property of high structure. Philblack A and Philblack O are two of the new blacks which have found wide acceptance in both natural and synthetic rubber compounding. Both of these blacks have demonstrated outstanding ability to smooth out rubber compounds and to improve the over-all factory processing characteristics of almost any compound when used alone or in conjunction with other types of blacks. This improvement is evident in shorter Banbury mixing cycles, smoother and faster extrusion, and in fewer factory rejects. In dynamic applications these blacks impart excellent resistance to chipping and cracking, and, as a result, tire treads containing these blacks have performed unusually well in this respect.

The excellent performance of these new furnace blacks has brought up, of course, the matter of comparison of their various physical and chemical properties with representative blacks of the thermal, semi-reinforcing, channel and conductive black types. Since little information has appeared previously on the Philblack carbons, it is the objective of this paper to present rather comprehensive physical and chemical data on these products.

In the early day application of carbon black in rubber, little was known concerning the really important physical and chemical criteria which would help to characterize its behavior in vulcanizable elastomer compositions. As time passed, however, much scientific effort was expended in the development of useful analytical tests which today may be classified somewhat generally under the headings of (a) physical, (b) physico-chemical and (c) chemical.

The physical tests include those for particle size, surface area, crystal structure, gravity, and grit content. The physico-chemical tests include many which help to characterize the surface and surface area of different blacks, the "structure" of the black and the tarry con-

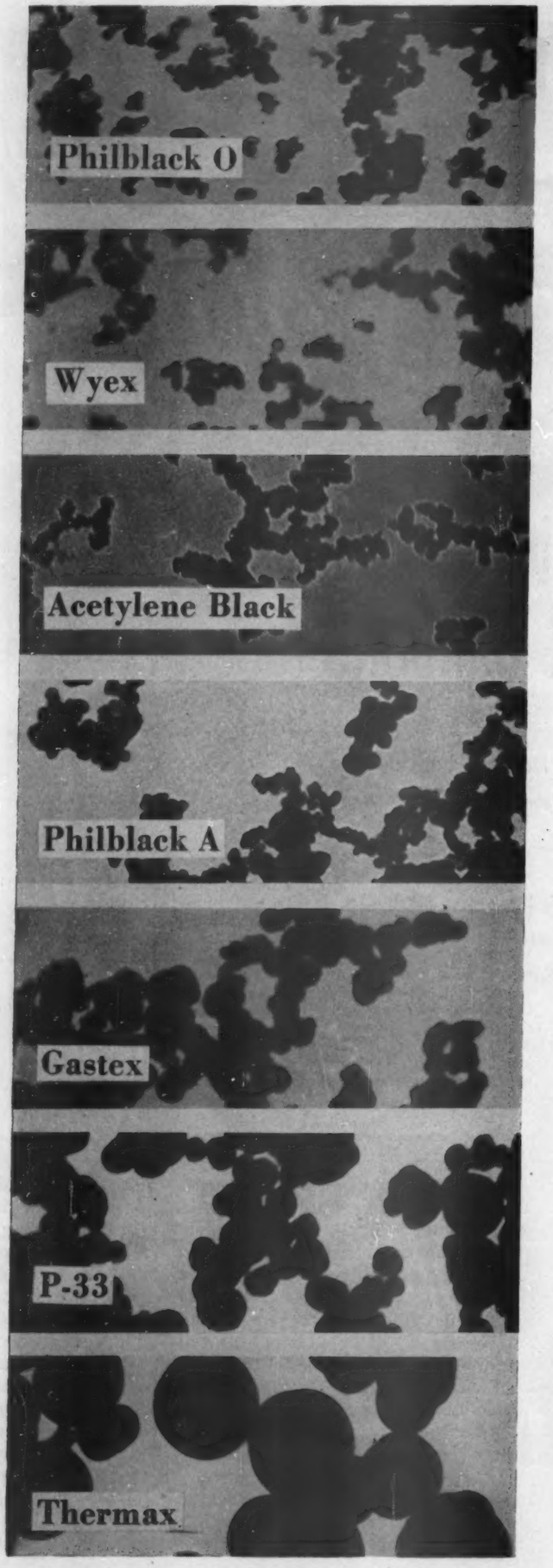

FIG. 1—Electron Micrographs of seven carbon blacks (33,350X).

stituents of the black. More specifically, the tests which have been devised to throw some light onto the surface and surface area characteristics of carbon blacks include tint, color, surface tension increase, diphenylguanidine (DPG) adsorption, acid adsorption, heat of wetting, surface activity and pH. The oil adsorption test has found wide acceptance because it gives an insight into the so-called "structure" of the black. The tarry constituents of the black which reflect the staining tendencies of the black are determined by a simple extraction test using acetone or chloroform as the extracting solvent. The more common chemical tests which have been used for a long time and which are still being used are those for ash content and per cent volatile matter.

Chemical and physical property data on carbon blacks are of greatest significance, of course, when related in some manner to performance in finished products. Consequently, as a means of classifying Philblack A in usual carbon black technology, it should be mentioned that it is a high modulus furnace (HMF) black and that service tests during the past five years have shown it to give a reinforcement level in terms of abrasion resistance of from 80 to 100 per cent of easy processing channel (EPC) black. Philblack O, a high abrasion furnace (HAF) black, is still fairly new although now in large scale commercial production. Many tire tests evaluating this black have shown that it possesses a reinforcement level approximately 110 to 120 per cent of that possessed by channel black, and that it has contributed markedly toward very superior tire life *(13)*.

Comparison of the physical and chemical properties of the Philblack carbons has been made with other representative black types, namely, channel (Wyex), acetylene, semi-reinforcing furnace (Gastex), fine thermal (P-33) and medium thermal (Thermax). As will be noted below, these seven different blacks cover an extremely broad range of properties.

Particle Size Measurements

In recent years much attention has been devoted to the classification of carbon blacks by particle size and by the related property of specific surface area assumed to be available for rubber reinforcement. To date, two general methods of measuring these properties have found wide acceptance in the industry, electron microscopy and low temperature nitrogen adsorption, both of which will be discussed below.

Particle sizes of the carbon blacks discussed in this paper were measured from electron micrographs similar to those shown in Figure 1 which are representative enlarged prints of the electron micrographs of Philblack O, Wyex, acetylene black, Philblack A, Gastex, P-33, and Thermax, in order of increasing particle size (top to bottom).

In the preparation of the samples of carbon blacks described in this paper for electron microscope examination the same technique of dispersing the black in water was used in each case. The method involves as a first step the removal of tar and other hydrocarbons by Soxhlet extraction using xylene as a solvent. A paste is then prepared using 3 grams of carbon black and 0.3 gram of Triton NE, a liquid dispersing agent. A few drops of 0.1N sodium hydroxide is added, the mixture diluted to a concentration of 3 per cent carbon black, the resulting suspension run through a hand homogenizer or colloid mill, and it is boiled under total reflux for several hours. After boiling, the suspension is run through the hand homogenizer again and is then further dispersed by irradiation in an ultrasonic field.

One drop of the freshly made suspension is imme-

diately placed on the thin plastic film substrate commonly used in electron microscopy. It is dried by gentle heating, after which it is carefully washed with a few drops of distilled water, drawing off each drop successively with a blotter. This washing is necessary to remove the small amount of dispersing agent, which, unless removed, causes the electron microscope images to be diffuse. Care must be taken to avoid too vigorous washing which would tend to dislodge the particles adhering to the substrate film. After again drying, the specimen is ready for examination.

Electron micrographs were made of the specimens at a magnification in the range from 6000 to 10,000 diameters. In making these micrographs, care was taken to minimize the growth effect reported by Watson *(16)*. This was accomplished by using his technique of focusing on one field and shifting the specimen quickly to another field for taking the micrograph.

The diameters of the carbon black particles were measured on glass plate contact prints of the electron micrographs by use of a low power optical microscope fitted with a calibrated eyepiece. Only particles showing at least half a diameter unmasked by other particles were measured. All measurable particles in a given field were measured and particles on several plates were measured by at least two observers.

For these investigations the electron microscope was calibrated by use of a replica of a 30,000 lines per inch diffraction grating, the spacing of which was measured in turn with an optical microscope. The reproducibility of this calibration was about five per cent. Since the accuracy of the average diameters depends on the number of particles measured, counts were continued until further observations made little change in the shape of the distribution curves. The number of particles per sample varied from 500 to 2700 particles for different blacks.

Numerical particle size distribution curves for the seven blacks previously mentioned are shown in Figure 2. The ordinate point of these curves are the centers of histogram size intervals of about 40 Angstrom units width. Particles present in greatest abundance are represented by the size range at the peak of the curve. The arithmetic average diameter may be calculated from the following relation:

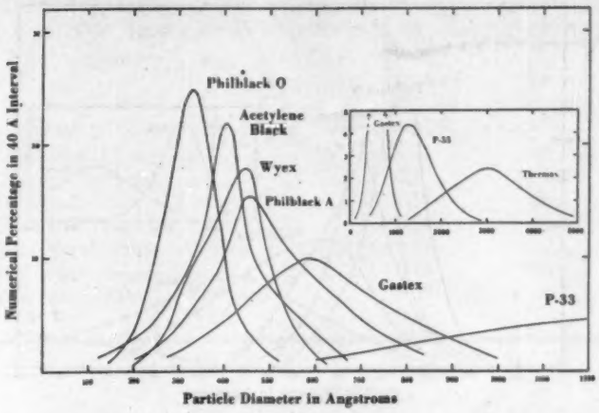

FIG. 2—Numerical size distribution of carbon blacks from electron micrographs.

$$d_{avg} = \frac{\sum_{i=1}^{i=k} n_i d_i}{\sum_{i=1}^{i=k} n_i} \qquad (1)$$

where n_i is the number of particles in the ith range of sizes, the mean diameter of each being d_i, k is the number of size ranges, and the summation n_i is the total number of particles counted. It has sometimes been the practice to calculate a fictitious equivalent "area average" diameter from the specific surface area and absolute density, assuming spherical particles. This diameter is that of uniformly sized particles having the specific surface area of the sample being considered. Such "area average" diameters may also be calculated directly from the data contained in the particle size distribution curves. The formula is

$$\text{Area average diameter} = \frac{\sum_{i=1}^{i=k} n_i d_i^3}{\sum_{i=1}^{i=k} n_i d_i^2} \qquad (2)$$

where the symbols are the same as in equation (1). This diameter is not in general the same as other types of average diameters and it is determined primarily because it is a more useful diameter value to use in correlating with other data. In Table I are given the particle size characteristics of Philblack O and Philblack A along with the other commercial blacks.

From Figure 2 and Table I, it is apparent that Philblack O possesses an average particle diameter smaller than that of the sample of the channel black (EPC) studied, although other investigators have reported diameters for EPC black in the same range as that shown by Philblack O *(7, 9)*. The particle size distribution curve of Philblack O is somewhat narrower than that of the EPC black studied. Philblack A on the other hand is between EPC black and SRF black in its mean particle diameter, but closer to channel black in its particle size distribution characteristics. The extremely broad particle size distribution curves for P-33 and Thermax are very pronounced, as are their comparatively huge sizes.

TABLE I—PARTICLE DIAMETER BY ELECTRON MICROSCOPY

Black	Area Average Diameter A	Arithmetic Mean Diameter A	Arithmetic Diameter from Literature A
Philblack O	360	345	
Channel Black (Wyex)	445	420	350*(9)*
Acetylene	460	400	375*(9)*
			430*(7, 16)*
Philblack A	590	510	550*(9)*
Semi-Reinforcing Furnace (Gastex)	710	615	
Fine Thermal (P-33)	1740	1400	1200*(9)*
			740*(7)*
			1050*(16)*
Medium Thermal (Thermax)	3710	3150	3590*(9)*
			2740*(7)*

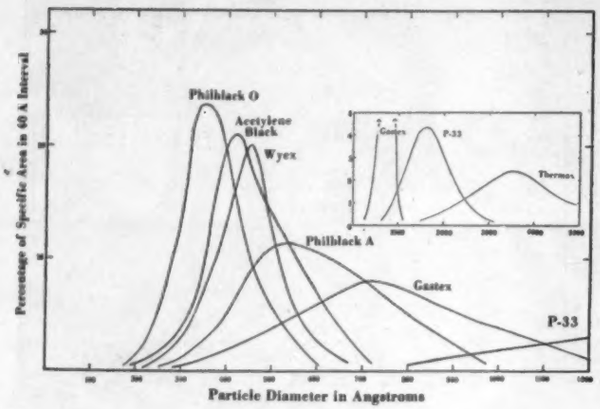

FIG. 3—Area size distribution of carbon blacks from electron micrographs.

Surface Areas by Nitrogen Adsorption and by Electron Microscopy

In determining the surface area by nitrogen adsorption, the volume of nitrogen necessary to form a so-called monomolecular layer on the surface of the carbon specimen is measured at the temperature of liquid nitrogen *(5, 6)*. This volume, or v_m as it is called, can be converted to an area value by multiplying the number of nitrogen molecules by the area covered by one molecule. The possible errors incurred in this evaluation are subject to the estimation of the v_m value and in the estimation of the surface covered by the individual nitogen molecule.

The surface area may be calculated also from electron microscope data by use of the following relation:

$$\text{Area (square meters per gram)} = \frac{6 \times 10^4 \sum_{i=1}^{i=k} n_i d_i^2}{\rho \sum_{i=1}^{i=k} n_i d_i^3} \qquad (3)$$

where ρ is the specific gravity of the carbon black in helium, d_i is the mean diameter of each histogram interval in Angstrom units, and n_i and k the same as in equation (1). The discrepancy existent between surface areas determined by nitrogen adsorption and by electron microscopy is usually discounted on the basis of the experimental accuracy of the two methods. Considerable information has been developed in this laboratory which indicates that nitrogen surface area may not be a measure of true surface area but rather an aggregate measure of surface area and surface energy, i.e., energy per unit of surface. The surface areas of Philblack O and A and the representatives of the other carbon types as measured by the nitrogen adsorption method and by electron microscopy are given in Table II.

In general, the results obtained in this laboratory by the nitrogen adsorption method check very well with published values with the exception of the channel black. However, repeated checking on different samples from the same bag did not appreciably lower the value of 131 square meters per gram and it is assumed that this value is specific for the sample studied. Other samples of EPC blacks studied gave surface areas ranging from 99 to 114 square meters per gram which agree well with published values. These data show that Philblack O possesses a surface area which is considerably higher than other furnace blacks, and on the basis of the electron microscope data, the surface area of the Philblack O is approximately 20 per cent greater than that of the channel black studied.

To aid in a visualization of how the total surface is distributed in the various sized particles, area distribution curves are shown in Figure 3. Here the ordinate points are the percentages of the specific area contributed by the particles in the same particle diameter ranges as in Figure 2.

Surface and Surface Properties by Other Methods

Other methods that have been widely used by different investigators to obtain an insight of the surface area or nature of the surface have included tests for tint, color, surface tension increase, iodine adsorption, DPG (diphenylguanidine) adsorption, and acid adsorption. The first four methods have been used primarily to furnish an idea of the particle size or surface area of the carbon black while the latter two methods have been used to determine the relative effect of the black upon

TABLE II—SURFACE AREA VALUES

Black	Surface Area by N_2 Adsorption sq. meters /gm.	Surface Area from Electron Microscopy sq. meters /gm.	Surface Area by N_2 Adsorption from Literature sq. meters /gm.
Philblack O	82.4	84	——
Channel (Wyex)	131.0	70	110.2*(8)*
Acetylene	64.4	69	64.0*(12)*
			64.5*(8)*
Philblack A	39.5	52	——
Semi-Reinforcing Furnace (Gastex)	25.6	44	26.0*(1)*
Fine Thermal (P-33)	16.6	18	15.0*(2)*
			22.1*(8)*
Medium Thermal (Thermax)	6.5	8.5	7.7*(8)*

TABLE III—PHYSICO-CHEMICAL PROPERTIES

Black	Tint	Color	Black Concentration to give 20 dynes/cm Surface Tension Incr.	Iodine No. (mg/gm)
Philblack O	174	124	11.3%	91.2
Channel (Wyex)	226	171	12.6	80.0
Acetylene	125	91	8.8	82.0
Philblack A	114	94	13.7	41.0
Semi-Reinforcing Furnace (Gastex)	98	82	16.0	24.8
Fine Thermal (P-33)	62	48	27.5	28.8
Medium Thermal (Thermax)	27	0	35.3	7.5

the rate of cure of vulcanizable elastomer-black compositions.

None of the methods mentioned has been wholly successful in its appointed task. Although most of the tests mentioned have been previously described in the literature, a brief resume of the experimental procedures used is included for the reader. Related tests will be discussed in groups followed by data and a discussion of results.

The tint or tinting strength of a carbon black as determined in this laboratory is expressed as the ratio of the weight in milligrams of a standard black required to match in color 100 milligrams of unknown black when each is intimately mixed with 2 grams of zinc oxide and 2 milliliters of linseed oil. The standard black of 100 tint used in the data reported in this paper is an experimental black selected years ago by Phillips as a reference standard. The tinting strength is a rough indication of the reinforcement value or the available surface of the black, the higher the tinting strength the higher the reinforcement level or the available surface. The procedure used was very similar to that used by Sweitzer and Goodrich *(15)*.

The color was determined according to the procedure of Sweitzer and Goodrich. An increase in the color index is supposedly representative of an increase in the surface area or a decrease in the particle diameter of a sample.

If carbon black is mixed intimately with linseed oil, the rheological properties of the linseed oil change with the amount and type of black present. One of the ways of following this change is to measure the surface tension of the mix and to calculate the increase in surface tension attributable to the presence of the carbon black. For any given black the "surface tension increase" becomes greater with increase in concentration of black until the rate of increase is very rapid with only a very small additional increase in the black concentration. Since the curve approaches a maximum slope at about 20 dynes/cm above that of the linseed oil base, this point has been selected as the point of comparison, and the concentration of black in linseed oil required to effect this increase in surface tension was determined.

Iodine number was determined in the conventional manner with but one change in the procedure. Since the iodine can be selectively adsorbed by the carbon black or can react with potassium iodide to form potassium periodide, the variation in iodine concentration can have a marked effect upon the iodine number since the point of equilibrium between the two competing reactions will vary with the concentration of unadsorbed iodine present in the solution. In order to discount the effect of the $KI+I_2 \rightleftarrows KI_3$ reaction the determination of iodine numbers was made at a constant KI/I_2 ratio of 3.5 to 1. This was accomplished by varying the carbon black concentration in the 0.02N iodine solution until the normality of the iodine not adsorbed was reduced to 0.014N. The results of the tint, color, surface tension increase, and iodine number determinations are given in Table III.

TABLE IV—ADSORPTION VALUES AND pH

Black	pH	DPG Number	Acid Number
Philblack O	9.1	11.3	24.0
Channel (Wyex)	3.8	43.2	23.1
Acetylene	6.5	12.3	57.7
Philblack A	9.7	4.2	23.3
Semi-Reinforcing Furnace (Gastex)	9.1	2.8	33.9
Fine Thermal (P-33)	7.6	2.8	18.2
Medium Thermal (Thermax)	7.6	0.4	6.1

TABLE V—HEATS OF WETTING AND SURFACE ACTIVITY DATA

Black	Heat of Wetting cals/gm.	Surface Activity ergs/sq. cm.
Philblack O	1.71	84.1
Channel (Wyex)	4.10	241.7
Acetylene	1.14	69.0
Philblack A	0.64	51.4
Semi-Reinforcing Furnace (Gastex)	0.55	52.1
Fine Thermal (P-33)	0.15	34.6
Medium Thermal (Thermax)	0.05	26.1

The data in Table III show a general trend toward decreasing particle size or increase in surface area from the thermal decomposition black on one extreme to the Philblack O on the other extreme. Qualitatively, the surface tension increase test arranges the blacks in their relative order of reinforcement in rubber (acetylene excepted), whereas the tint and color results show the FPC black to be superior to Philblack O which has not proved to be the case in actual fleet test operations *(13)*.

The iodine numbers line up in close approximation with the surface area values determined by electron microscopy, the only black not falling in line being the fine thermal black. These data show that the iodine number of a black is indicative of the possible reinforcement characteristics which it possesses in rubber.

In general, rubber carbon blacks have pH values that range between 3 and 10, channel black being on the acidic side and most furnace blacks being on the basic side. The pH of the carbon black was determined in the normal manner using the procedure of Sweitzer and Goodrich *(15)*.

DPG (diphenylguanidine) adsorption has been widely used in the past in channel black evaluation to give an idea of the so-called relative accelerator adsorption properties of the black. The DPG number is simply the number of microequivalents of DPG adsorbed per gram of black, and since DPG is a base, it is probable that the DPG number of channel blacks is essentially a measure of the acidity or pH of the black. A straight acid neutralization is not all that is concerned, however, since a small amount of DPG is adsorbed by furnace blacks having high pH values. This latter adsorption is normally accredited to van der Waals forces and, as such, might be interpreted as an indication of the total surface of the black.

Since most of the blacks investigated in this paper had basic pH values, it was felt that it would be desirable if a DPG test in reverse could be run. Accordingly, the acid adsorption of the blacks was studied using 0.001N HCl solution (instead of the 0.001N DPG solution). The acid number of the blacks represents the number of microequivalents of HCl adsorbed per gram of black.

Table IV gives the results of the pH, DPG adsorption, and acid adsorption determinations. The data show irregularities that indicate that both DPG and acid numbers are considerably affected by van der Waals forces as well as by the relative acidity or basicity of the black specimen. Consequently, acid or DPG numbers of carbon blacks manufactured by different methods are not of much value in giving an estimate of particle size or the relative accelerating or retarding effect of the carbon

TABLE VI—MISCELLANEOUS PHYSICAL AND CHEMICAL DATA

Black	Oil Adsorption cc's/gm.	$CHCl_3$ Color	Density		Per Cent Volatile Matter	Per Cent Ash
			Helium	Acetone		
Philblack O	1.20	straw	1.98	1.808	1.13	0.156
Channel (Wyex)	1.02	pale straw	1.93	1.809	6.25	0.050
Acetylene	2.85	light yellow	1.87	1.818	0.53	—
Philblack A	1.25	straw	1.95	1.806	1.13	0.118
Semi-Reinforcing Furnace (Gastex)	0.77	dark yellow	1.94	1.843	0.52	—
Fine Thermal (P-33)	0.56	dark brown	1.88	1.859	—	—
Medium Thermal (Thermax)	0.27	light yellow	1.87	1.881	—	—

black. At least, this is true for the conventional method of backtitrating the unadsorbed DPG or HCl.

Heat of Wetting and Surface Energy

Very little information exists in the literature on the heat of wetting of rubber grade carbon blacks using conventional immersion methods *(4, 11)*, but it was felt that such information should probably serve as a fairly good indication of the relative reinforcement potential of carbon blacks, providing the contact angle existent between the adsorbent and adsorbate would remain constant for all blacks studied. Recently, Beebe et al *(2)* have published data on the heats of wetting of carbon blacks by nitrogen, butane and other inorganic and organic gases at or near their points of liquefaction using a platinum calorimeter in conjunction with the regular BET adsorption apparatus. These investigators sum up their work by stating that "the differences in surface activity . . . appear to parallel the rubber reinforcement properties of the blacks which have been investigated." In this laboratory, the heats of wetting of carbon blacks immersed in methyl alcohol were determined using a 20 junction thermocouple and a specially constructed calorimeter. The heat of wetting in calories per gram can be converted to energy in ergs per square centimeter by the following equation:

$$\text{ergs/sq. cm.} = \frac{jc \times 10^7}{A \times 10{,}000} \quad (4)$$

where $j = 4.185$ joules $= 1$ gram calorie,
$c =$ cals/gm of heat liberated by wetting, and
$A =$ area of carbon black in square meters/gram.

For the area of the carbon black the electron microscope data were used in preference to the nitrogen adsorption surface area since a referee method indicated the electron microscope results to be correct. The referee method used for the determination of surface area was the Harkins-Jura absolute method *(10)* which gave results which are in close agreement with those obtained by electron microscopy. Using the above equation, the energies of the surfaces of the carbon blacks in ergs per square centimeter may be calculated. The results of this investigation along with other data are reported in Table V.

The calories of heat liberated per gram of black show a gradual increase with an increase in surface area with channel black being sharply out of line. Since channel black has a high oxygen content, it is possible that hydrogen bonding occurs or that a type of esterification takes place beteen the acid constituents of the black and the methyl alcohol; if either of these phenomenon occurs, then the measured heat of wetting is too high and is a measure of both the heat of chemisorption and the heat of physical adsorption. Since the energies are calculated from the heat of wetting values, the comments relative to chemisorption in the case of channel black also may apply to the energy results.

On the basis of the writers' experience to date, no commercially manufactured blacks tested in this laboratory have shown a purely physical heat of adsorption which approaches that shown by Philblack O, assuming chemisorption or the like accounts for part of the heat effect observed with channel black. The superior reinforcing properties of Philblack O in rubber may be attributed largely to its high surface area and its greater energy per unit of surface.

Miscellaneous Physical and Chemical Properties

The miscellaneous physical and chemical properties are listed in Table VI.

The oil adsorption data which are generally considered to be an index of the "structure" of carbon black or the ability of the carbon black to form chains indicate that both Philblacks possess more "structure" than the other blacks but fall far short of approaching acetylene black in this respect.

The chloroform color test is devised to measure the tarry constituents of carbon black and is performed very simply by shaking one gram of carbon black in 10 milliliters of chloroform, filtering and observing the color of the solution. The colors vary roughly from clear to straw to yellow to red-brown to brown as the percentage of tarry constituents increases. This increase in tar content can be followed by the use of a photometer if visual inspection is not acceptable. The main interest in this property is related to rubber applications where non-staining properties are essential. Carbon blacks possessing chloroform colors up to a light yellow by the above method may be considered safe for non-staining applications.

The specific gravity of carbon black is of interest from a compounding standpoint in calculating volumes and gravities. The specific gravities of the various carbon blacks studied have been determined by the pycnometer method using acetone as the liquid medium and by the simple pressure-volume relationship with helium as the gas. These are reported in Table VI. The differences in specific gravity by the two methods may be attributed to unevenness of the surface of the black and the size of the molecules of the wetting media or to attractive forces existing between the carbon black and acetone which probably would not be present between carbon black and helium. For rubber work the specific gravity of carbon black determined in acetone is probably the desired value to use.

The percentages of volatile matter and ash were determined by conventional methods in use in the industry today. A good discussion of the volatile matter content

and ash content is given by Stokes and Dannenberg *(14)* and need not be considered here.

X-Ray Crystallite Studies

For purposes of this discussion a particle of carbon black is assumed to consist of a ball of smaller crystallites. Figure 4 after Biscoe and Warren *(3)* illustrates this conception. The average sizes of the graphite-like crystallites of these carbon blacks were calculated from their X-ray line broadening in a manner similar to that of Biscoe and Warren. Samples were extruded from a capillary and no binder or container was used. Crystal monochromatized X-rays from a chromium target were passed through the sample in a cylindrical light-tight camera filled with helium. The density of the film record of the diffracted X-rays was measured with a microphotometer. One per cent aluminum dust was added to all samples as an internal standard to correct for those variables such as differences in bulk densities of the extruded carbon blacks and for film shrinkage.

Corrections were made for such things as the atomic scattering function of carbon, the absorption factor due to the density and shape of the sample, and the continuous background scattering due to helium. The dimensions of the crystallites were then calculated on the corrected line broadening curves using the width at half intensity for the L_c measurement and the half width on the low angle side of its peak for the L_a measurement with an appropriate factor to compensate for the unsymmetrical curve. The data are given in Table VII. L_a is the average dimension in the plane of the graphite-like layers, and L_c is the average dimension perpendicular to those layers. N is the average number of crystallites per particle, using the "area average" diameter from electron microscopy.

The values of L_a and L_c define the average dimensions of the crystallites and it is probable that there is a size distribution of these crystallites within the carbon black particles, each particle being a heterogeneous system containing crystallites both larger and smaller than the average.

The accuracy of crystallite size measurements by X-ray line broadening depends on the assumption that the crystallites are not strained, since strained or distorted crystals will contribute a line broadening in addition to that produced by the small size. A correction was made for lack of symmetry in the line intensity curve which may be in error, although it would be a systematic error.

TABLE VII—CRYSTALLITE DATA FROM X-RAY DIFFRACTION

Black	L_a in Å	L_c in Å	Area Average d Å	N
Philblack O	16.8	12.6	360	13,000
Channel (Wyex)	17.8	13.0	445	13,000
Acetylene	48.9	25.1	460	1,600
Acetylene (by Biscoe and Warren)	47.5	26.6	—	—
Philblack A	18.2	14.3	590	50,000
Semi-Reinforcing Furnace (Gastex)	20.1	15.0	710	60,000
Fine Thermal (P-33)	30.2	17.6	1740	330,000
Fine Thermal (by Biscoe and Warren)	28.0	16.8	—	—
Medium Thermal (Thermax)	30,8	16.5	3710	2,000,000

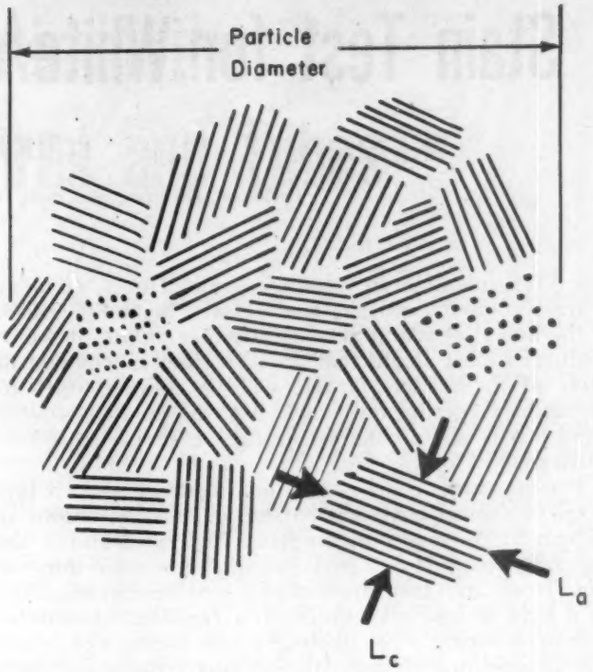

FIG. 4—Schematic diagram of the structure of carbon blacks (after Biscoe and Warren).

The reproducibility of the data is about plus or minus ten per cent.

ACKNOWLEDGMENT

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Stain Test for White or Light Colored Rubber

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IN THE manufacture of white sidewall tires, or other light colored goods, it is necessary to know, before the items are manufactured, whether or not the compounded rubber stocks that are to be used as component parts of the finished article will be staining or non-staining. Experimental work has shown that a very rapid test is easily obtained, using the simple apparatus illustrated.

The apparatus consists of a box made of ¾-inch plywood of the approximate outside dimensions shown in Figure 1. As may be seen from Figures 2 and 3, the top, sides, bottom, and back end of the box are integral. The front and tray are integral and removable. The twin light source is mounted on a removable board for ease of servicing. The lighting source consists of "Guth Air Disinfecting System Ultra Violet Irradiation" lamp holders equipped with General Electric germicidal lamps, all of which may be obtained from Edwin L. Guth Co., St. Louis 3, Mo., or from any General Electric Supply house. Figure 2 illustrates the lamp board removed from the box and Figure 3 illustrates the assembled unit.

In conducting a "stain" or "bleeding" test, the samples are laid on the tray—half exposed and half covered, with masking tape, without any strain. The box is closed and the lights turned on for a thirty minute or more exposure time after which a non-stain stock will show no difference in color between the exposed and covered portions. A staining stock will show a color varying from tan to dark brown depending upon the degree of contamination. A very desirable feature of this apparatus is that unvulcanized as well as vulcanized rubber can be tested.

White, or light colored factory mixed stocks may be tested directly for staining. Dark colored stock (body stocks, friction stocks, gum stocks, etc.) may be tested by first applying an .050-inch or less veneer of laboratory mixed, stain-free, white stock, and then (half covered and half exposed) exposing to the light.

In the operation of this unit large amounts of ozone,

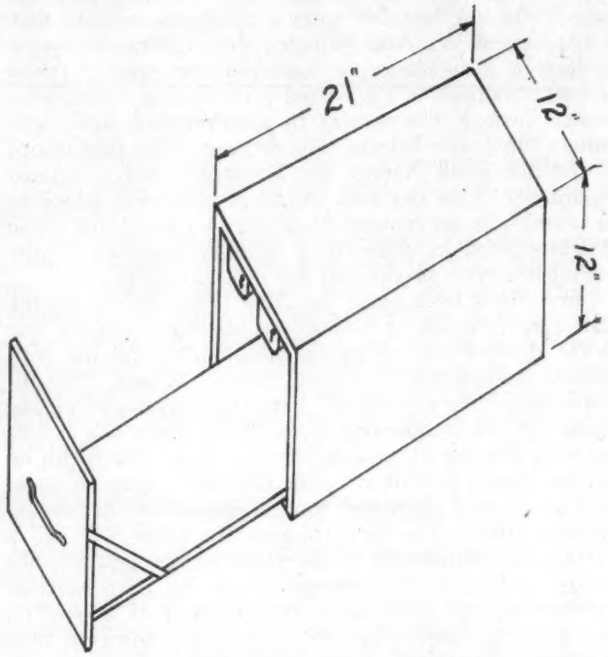


FIG. 1—Dimensions of the testing unit.

as well as ultra violet light, are generated. Therefore, it is well to observe a few precautions. Because of the harmful effect of the ultra violet rays on the eyes, one should avoid looking directly at the lamps and because of the danger of sun burn, one should avoid exposure of the skin to the lamp rays for more than a few seconds. To reduce the diffusion of the ozone into the room, the box should be lined with copper screen or copper sheeting. In any event, the box should be kept closed and the other test pieces should not be stored near the box, as the other tests may be adversely affected.

FIG. 2—Box with lamp board removed.

FIG. 3—The complete assembled unit.

Compressed Air in the Manufacture of Tires and Tubes

One of the factors in processing operations generally taken for granted is the use of compressed air. It is freely admitted that compressed air plays an important role in a number of rubber processing steps, particularly in connection with tires and tubes, but such importance is rarely stressed. Because of this situation we are glad to publish the following article even though the manufacturing steps outlined are fairly well known and understood by rubber chemists and engineers. All data and photographs used were obtained by the Compressed Air and Gas Institute, Cleveland, Ohio, through the courtesy of the United States Rubber Co.—Editor.

THE use of compressed air bulks large in several of the production operations in the plant of the United States Rubber Co. at Los Angeles, California. The best proof of this statement is the capacity of the compressor room in the powerhouse of this plant (Fig. 1).

Most of the compressed air used in this plant is at 125 pounds pressure and is supplied by four compressors: 1250 cubic feet per minute with a 250 horsepower induction motor; 2000 cubic feet per minute with 400 horsepower synchronous motor; 1000 cubic feet per minute with 200 horsepower synchronous motor; and 1350 cubic feet per minute, steam-driven engine, with steam from nearby gas or oil-fired boilers having a capacity of 82,000 pounds per hour at 225 pounds pressure on the main. The largest use of steam is in the curing operations. A 450 cubic feet per minute compressor, with 125 horsepower motor, supplies compressed air at 225 pounds pressure for use in operations where the use of the 125 pounds pressure would require too large and cumbersome a cylinder to provide the pressure required.

In addition to these five compressors, four supplying compressed air at 125 pounds pressure and the fifth at 225 pounds pressure, there is a sixth unit, a 350 cubic feet per minute compressor, steam-driven, which is used as a standby unit for both pressures. Since almost the entire capacity of the five compressors in use is constantly needed, a new 3000 cubic feet per minute compressor, with a 600 horsepower synchronous motor, will soon be installed at the plant to carry the heaviest part of the load.

There are two air receivers at the powerhouse, one 5 feet in diameter by 20 feet long and the other 5 feet in diameter by 12 feet long, both for the 125 pound air storage supply, and one tank, 5 feet by 12 feet, for the 225 pound storage. Fifteen air receivers of varying size are located throughout the plant to maintain constant supplies and pressures for the particular areas of use.

The plant is currently operating with four 6-hour shifts daily, six days per week, requiring constant operation of the compressors. Considerable compressed air is also required on the seventh day for special uses, maintenance and other services.

The main air line from the powerhouse to the factory is of 8-inch diameter, and the radiating lines to all parts of the plant from the various receivers run down to ½-inch diameter. In addition to the larger-quantity uses of compressed air to be described further on, the maintenance department makes use of compressed air in various parts of the plant to operate portable and stationary units of equipment, hammers, drills, air motors, grinders, hoists, etc.

In the mold shop the final finishing of the tire molds is effected by fine, careful handwork. The surfaces must be smoothed down while staying within four or five thousandths of an inch of precise dimensional limits. The side wall ribs are rounded by hand-chipping with

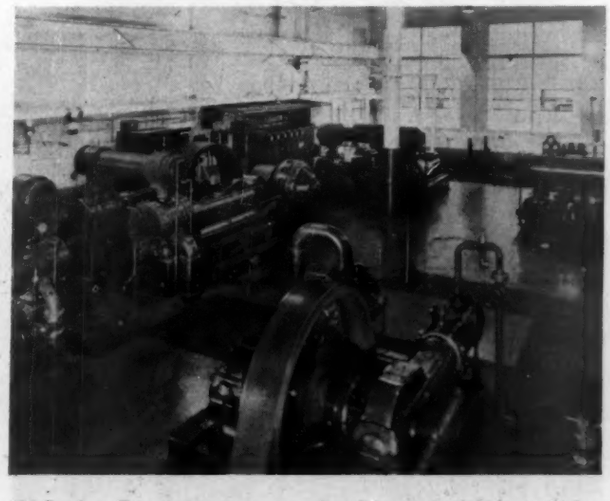


FIG. 1—Compressor room in the powerhouse of the U. S. Rubber plant at Los Angeles. The five compressors in use are clearly visible. The edge of the sixth, or standby compressor, may be seen at the extreme right.

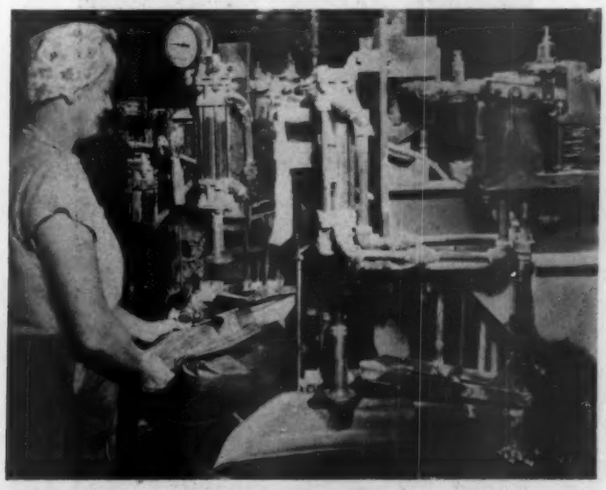


FIG. 2—Only one operator is required for each two valve-inserting machines. After the operator places the valve in the piston it is inserted in the tube by air pressure, as is demonstrated by the machine at the right.

FIG. 3—In this tube splicing operation, the operator loops the tube over the arm and an air-actuated stamp imprints brand name and other data.

a straight chisel and air hammer. Among the many other and too-numerous-to-mention miscellaneous uses of compressed air, hose and blow-gun combinations for cleaning machinery are the most numerous.

Production of Tires and Tubes

The first of the more outstanding uses of compressed air at U. S. Rubber's Los Angeles plant to be described is in connection with the production of inner tubes.

After the rubber stock is properly kneaded in the mill, it is fed in an endless stream into a tuber. As the extruded stock leaves the tubing machine, brand names are imprinted automatically on the surface of the stock, position being determined by means of an electric eye. Cutting off lengths of stock is also accomplished automatically.

The tube lengths are fed on a belt conveyor to the valve inserting machines (Fig. 2). Then they move to nearby tube splicing machines (Fig. 3) and thence to racks preparatory to being cured. Curing is accomplished in "watch case" heaters (Fig. 4), of which there are large numbers for both passenger car and truck tubes.

After curing and cooling, each tube is inflated with compressed air through hose connections and inspected in a water bath. The tube is then deflated and inspected for lumps and thin spots, and then sent through a long, continuous, tubular hot air dryer, which uses a large blower for air circulation. Then comes final inspection, and boxing and crating.

The second major use of compressed air to be considered is in connection with the plant's production of

FIG. 4—Inserting a truck tube in the "watch case" heater. The upper section of the mold is lifted after cure by an air cylinder in the rear.

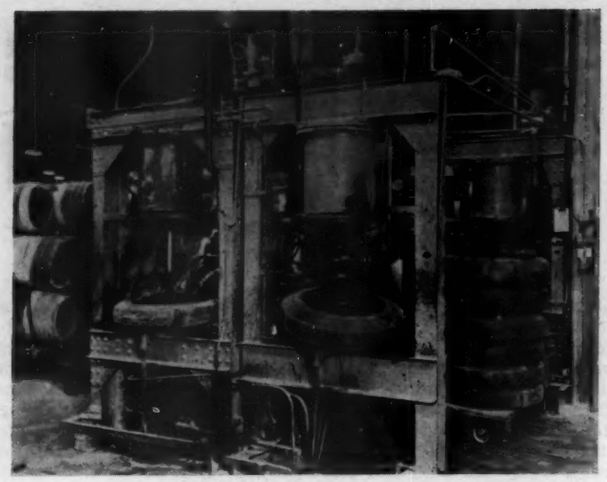


FIG. 5—Preforming beads on truck tires in hot ring presses. At the left, a tire is under heavy pressure as the ring forms the bead. At right, operator is removing a tire and rim after formation of the bead.

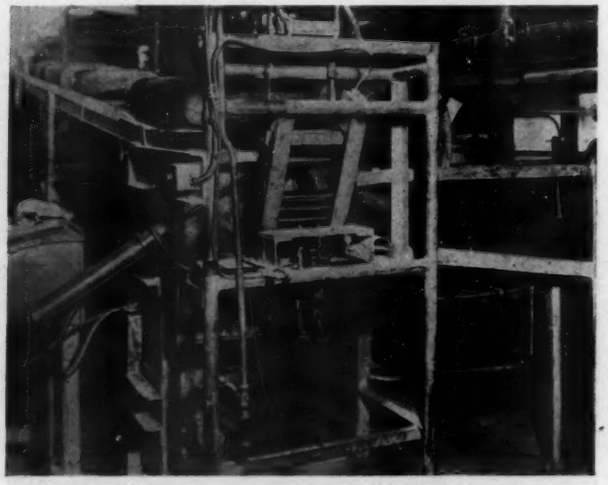


FIG 6—As the tires with preformed bead drop off the gravity-roller conveyor they actuate a compressed air ram which kicks them to the right to roll down for placement in molds on the curing line conveyor.

FIG 7—Compressed air cylinder applying pressure to rollers which squeeze the mold sections together preparatory to clamping. The molds travel to the curing pits which are visible in the right background.

tires. After the cylindrical-shaped carcass comes from the tire builder it is placed in a vacuum-box shaper, lubricated on the inside surface, and then the air bag is pushed inside the tire body by a vertically-descending, air-cylinder pusher. The action of the vacuum forces the mass into the desired shape once the top has been clamped down. Next, the bead is formed by a rim under heavy air pressure (Fig. 5), after which, with the rim holding it in proper form, the tire is ready for curing. While traveling on a roller conveyor to the curing line conveyor, the tires are kicked over by an air-cylinder ram (Fig. 6).

As soon as the tire reaches the curing line conveyor, it is placed in the lower section of a mold case and as the loaded mold case sections move along the conveyor

FIG. 8—After cure has been completed the upper and lower sections of the tire mold are separated by means of a compressed air-actuated unit, working with 225 pound pressure.

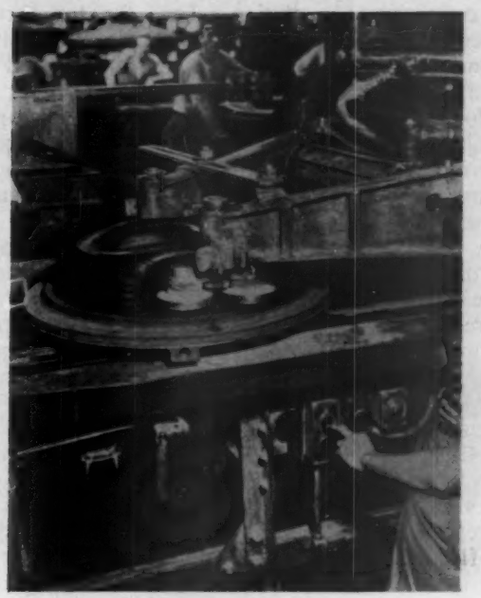


FIG. 9—Tires are loosened from the lower section of the mold by wheels suspended from each of two projecting arms. The wheels are forced against the tires by operation of an air cylinder.

the upper portion of each is lowered from an overhead conveyor to join the loaded lower section. After the two sections are joined they make a right angle turn onto a slat conveyor which moves the mold under the rollers of a compressed air-operated press which squeezes the sections together for clamping (Fig. 7).

The clamped molds then move on to the curing pits where there is a long row of rams waiting to receive them. The air bag is attached to a steam line and the ram carrying the mold then drops down into the curing pit and a lid is placed over the top of the pit so that the proper heat may be maintained for the length of time required to cure the tire.

After completion of the cure, the ram rises and the mold case is removed. The mold then travels on an-

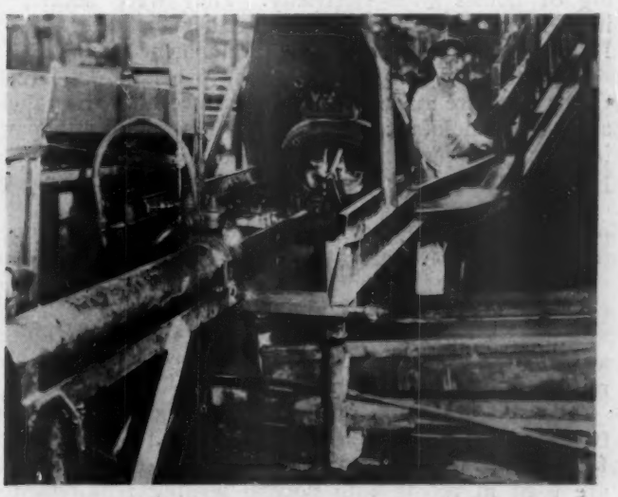


FIG. 10—For removal of the air bag the tire is fed under a compressed air ram which distorts it and opens it up at the bottom so that the air bag bellies out. It is actually pulled out of the tire by an air cylinder piston with a large hook on its end.

other conveyor to a station where the top section is loosened by an opening device operating on the principle of a pneumatic jack (Fig. 8). Then, as the mold moves onward, an overhead conveyor equipped with hooks dips down, the hooks are fitted into the upper part of the mold, and moves on, carrying with it the upper part of the mold to the point where it will be used again in the same manner as described, the entire operation being continuous and synchronized.

The lower section of the mold continues to move along on the same conveyor on which it was placed after the curing operation until it reaches a point where the tire is loosened by wheels suspended from projecting arms, the wheels being controlled in their operation by an air cylinder (Fig. 9). The tire itself moves on upward on a roller conveyor, while the lower mold section continues for a short distance to the reloading point, thus completing the entire cycle of operation.

The tire moves along on the roller conveyor until it reaches a machine operated by two air cylinders which removes the air bag. A ram descends to distort the tire, while from the rear a hook on the end of an air cylinder piston moves in to take hold of the air bag, guided by the operator. On retracting, the piston pulls the air bag clear and drops it onto a belt conveyor (Fig. 10) which returns it to its original point of use. The tire moves on through a painting machine, which uses compressed air to spray a black coating on the outer surface. It then rolls past a brushing arrangement which smoothes out the paint. Another overhead conveyor then carries the tire to the inspection station.

After being sorted by size, type and ply, the tires are carried to sloping roller conveyors which take them to turntables on which they are held in position by vertical rollers which maintain inward pressure through the operation of air cylinders. As the tires whirl around, operators remove the little projecting fins of rubber with small knives (Fig. 11).

FIG. 11—Removing the fins from the finished tire. In this operation, a hand-operated air cylinder causes the guiding vertical rollers to spread and then pulls them back to hold the tire in position while the operator trims from one side. Later, the other side is trimmed.

After being fin-picked, the tires are placed on another conveyor at the end of which they are picked off and elevated by a compressed air lift to travel on to the balancing machine, final inspection, labeling and to the warehouse to await shipment.

Uskon Radiant Heating Panels

THE United States Rubber Company has made some data available on its Uskon radiant heating panels which generate heat in the ceiling of homes, brief reference to which has been made in recent months. The panels, heated by a conductive rubber resistance element, make possible the efficient and economical heating of homes with electricity. They were developed in the company's Passaic plant under the direction of R. D. Gartrell, research and development manager.

The standard size of the heating panels is 4 x 4 feet. Other sizes are made to order when needed. The panels are about one-quarter inch thick, resembling standard interior building boards. They may be nailed to the joists in the ceiling or may be installed over an existing ceiling. There are no wires in the heated area of the panel. Wires bring current to the edge of the conductive rubber. The heating element is sandwiched between several layers of phenolic insulation and the laminated construction is made rigid by a backing of 3/16-inch asbestos board. Aluminum foil on the upper side serves as a reflector to prevent heat from going through the roof.

The panels operate on 220 volts. They are made in two standard wattage densities, 17 watts per square foot and 22 watts per square foot. The 17-watt panels are used in rooms with normal heating requirements. The 22-watt panels are used in bathrooms, over large window areas, and in rooms with abnormally high heat losses. The panels usually cover about 70 per cent of the ceiling. To provide the optimum results they are arranged in a peripheral pattern, with a non-heating section in the center of the room which is filled in with standard building board. The peripheral pattern produces a slight air circulation which prevents "stuffiness" and disperses tobacco smoke and kitchen odors.

The temperature in each room of a Uskon-heated house is individually controlled by thermostat. The surface temperature of the ceiling averages about 100° F. This affords a flexible system in which certain rooms may be reduced in temperature while others remain at a higher level.

The panels may be finished with paint, paper, plaster or fabric. The new system eliminates radiators, pipes and other obstructions which interfere with room decoration. It also rates high in cleanliness as there is no smoke, odor or soot. Coal bins, fuel tanks and furnaces are eliminated.

The heat may be turned on and off by the flick of a switch. The ceiling heats up to maximum temperature in about 15 minutes. Roomspace comfortable at 68° F. because the radiant heat "shines" directly on occupants, eliminating the necessity of warming the air. Conventional heating systems which distribute heat from radiators or hot air registers warm the occupants by first warming the air to a temperature of 70 degrees or higher. The floors become warm after a brief period of operation.

U. S. Rubber has already made a number of experimental installations of the Uskon panels in various types of homes, and excellent results have been reported. The original cost of Uskon is said to compare favorably with other systems.

Safety in Mechanical Goods Curing

By J. E. LOVAS

Safety Supervisor, U. S. Rubber Co., Passaic, N. J.

SINCE the discovery by Goodyear in 1839 of the vulcanization of rubber by heating with sulfur, many varied types of vulcanizers have been progressively designed. In a mechanical rubber goods plant, various methods are used to carry out the operation of vulcanization. The most important are open steam cures and press cures.

Open steam cures are used chiefly for curing hose, tubed goods and insulated wire. For this purpose a horizontal cylindrical vulcanizer, or heater as it is commonly known, is used. It is an unfired pressure vessel built to operate with high pressure steam. They are safely constructed under the American Society of Mechanical Engineers, American Standards Association and State unfired pressure vessels codes.

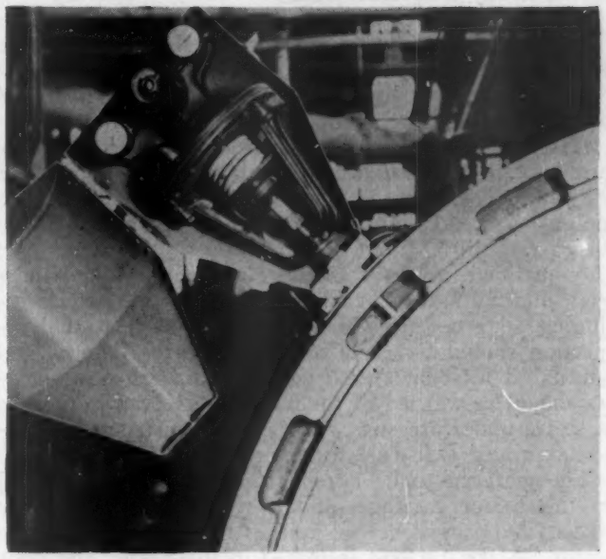
Horizontal Heaters

Despite the fact these heaters are constructed according to the foregoing standards and regulations, attention should be paid to certain accessories when installing for operating purposes in the plant. Some of the accessories are: pressure relief safety valves, steam gauges, reducing valves or automatic regulators, thermometers, steam traps, blow down valves, vent or testing valves, safety door inter-locks, external and internal tracks, carriages and winches.

Whenever possible duplicate pressure relief safety valves should be installed, one set slightly above the operating pressure and the other at the safe working pressure of the vessel. In this way the first valve would give warning of excessive pressure. To insure against clogging by coming in contact with corrosive vapors from vulcanization these valves should be installed in the main steam supply line.

On extremely low heaters, an escape pipe with at least the same cross-sectional area as the safety valve, should be connected to the valve to conduct the steam beyond the working area. This is to prevent possibility of burns or scalds to anyone working in the area of the valve when it blows. The escape pipe should be so arranged as to prevent the high temperature of exhausting steam from coming in contact with overhead fire control and sprinkler systems.

Automatic steam control and twin safety valves connected to main steam supply to vulcanizer.



Safety door lock on vulcanizer with guard in open position. The guard is normally kept closed and locked to prevent tampering of any kind.

Indicating steam gauges should be installed where they are clearly visible to the operator and should have dials reading up to at least 1½ times the safe working pressure of the vessel.

Reducing valves or automatic regulators are installed before the safety valves. They should be controlled by a common gate or globe-type valve to insure safe operation should the reducing valve or automatic control fail to function properly. On all automatic regulators, the steam valve should be of the indirect acting type to guard against a possible interruption of the power medium.

If the valve was of the direct acting type, such interruption could allow steam to rush into an open heater. Besides possible burns to employees who might be in the area, such leakage of steam into the room might also cause the sprinkler heads to go off. This in turn could cause serious damage to processed and raw materials and equipment. As an additional safeguard, the gate or globe-type shut-off valve should always be closed when the heater is not in use.

Blow down valves are used to relieve the heater of the stored pressure after the main steam supply is shut,

completing a cure. Where several heaters are connected to a common header through the blow down valves, a check valve should be placed in each blow-off line to prevent steam from being discharged into any open heater from another heater in the battery. As an added precaution an open heater should not be left with its blow-down valve open.

The vent or testing valve should be located on the top of the heater shell, as close as possible to the door. It should always be used to determine if there is any pressure remaining in the vessel before attempting to open the door. This valve also acts as a double check on the safety interlock.

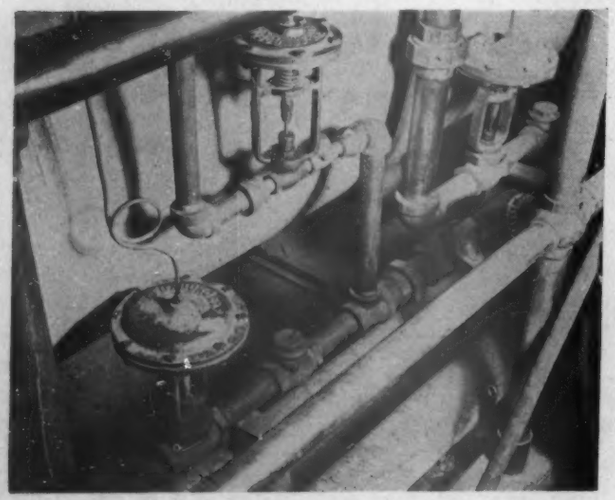
All heaters with quick-opening doors should be provided with a safety interlock. One of the most effective is the diaphragm-operated pin lock. Steam entering the heater forces the pin through the door-ring hole and between the lugs, thereby locking the door.

External and internal tracks should be properly secured to prevent the heater carriage from slipping off the rails. The carriage wheels should be guarded with toe-pushers, and winches should be employed to move the carriage in and out of the heater.

A qualified inspector should make periodic and thorough internal and external inspections of all heaters including all accessories connected thereto. External inspection should be made once every three months and internal at least once each year. All operators of heaters should be warned of the hazards involved in the use of steam under pressure, and carefully instructed to follow approved safe rules of operations.

The material to be cured should be securely placed on the heater carriage, and the door tracks securely placed in position before rolling the carriage into the heater. After the load is placed in the heater, the door tracks are removed. If the heater is equipped with a quick opening door, all lugs should be entirely closed so that each lug carries the proper load.

If using a bolted door, tighten all bolts gradually and evenly all around so that the entire pressure will not be thrown on a few of the bolts. Use a wrench which will not over-strain and injure the bolts. In tightening bolts, take those which are diametrically opposite each other to get uniform tension. All bolts should be used at all times.



Automatic main steam blow down valve with check valve and manually operated globe valve on one of a battery of vulcanizers connected to a common header.

Where automatic controllers are not used, partially close the blow-down valve and turn on the steam supply. When curing pressure or temperature is established, completely close the blow-down valves so that the steam trap can discharge the condensate.

As the curing cycle is completed, close the steam supply valve and open the blow-down valve. When the steam gauge indicates zero pressure, open the test vent valve for assurance that no pressure remains in the vessel. Loosen all bolts on the door in the same sequence as when closing it. The last bolt to be removed should be the one diametrically opposite the hinge.

The operator, when pulling the door open, should place himself in a position where he cannot come in contact with flash steam which is discharged when the door is partially opened.

Following are some safety rules that can be applied to vulcanizer operations:

1. Operate a vulcanizer only if authorized.
2. Be sure you know how all safety devices operate.
3. Test the safety valve at the start of each shift.
4. Before turning on steam or air, securely lock the door. Make sure all bolts are properly placed and securely fastened, and that lugs are fully matched.
5. Do not unlock the door or release any safety device until all pressure is released and the vulcanizer is completely drained of water.
6. When you open the door, stand to one side where steam and hot water cannot reach you.
7. Load vulcanizer tracks carefully. Lock tracks firmly in place.

It should be emphasized that any defects in equipment, especially back-pressure in the vulcanizer, should be promptly reported to the foreman.

Platen Presses

Platen presses are used for curing molded goods, belting, matting, rubber tiling, large rubber slabs, sheet packing, etc. For molded goods, curing presses vary in size, insofar as the platens are concerned, from 18 inches to 48 inches. For belting and other cures they vary in size from 48 inches to 60 inches wide and up to 30 feet in length.

The platens are heated internally with steam by manual or semi-automatic control, at different pressures, the maximum being 100 pounds. They are subjected to external pressures applied by single or multiple rams through the medium of hydraulic water pressure of 2000 pounds per square inch. Therefore, it is important that careful attention be given to the material used in the construction of the platens.

Steel or meehanite is preferable to cast iron. Cast iron platens have been known to become ruptured, causing them to explode. One of the causes are unseen imperfections when manufactured. Others are concentration on small areas of platen surface, platens not properly blocked to equally distribute the pressure, and metal fatigue due to constant use over long periods.

The most common injuries suffered by press operators are burns. Extreme caution should be employed to prevent coming in contact with the hot equipment. Long sleeve shirts and heat resistant gloves should be worn at all times while working around the equipment. Wherever it is possible, hot surfaces should be covered with asbestos material.

In mold curing operations the handling of molds is a big factor in causing accidents. This is especially true while opening the molds before and after the cure and also in handling them in and out of the press. Suitable tools should be provided for prying the molds open and

they should be maintained in very good condition at all times.

An important step in preventing injuries caused from handling the molds in and out of the press is the installation of hydraulically operated adjustable tables which can be leveled with the platens.

Hoists should be provided for the handling of heavy molds. Where hoists are used to open hinged molds, the top plate should be swung beyond the 90° angle. Where this is impractical, an auxiliary chain and hook should be used. This will eliminate possibility of injury while the mold cavities are being filled or emptied, should there be a failure of any kind in the hoisting equipment.

Some presses are equipped with quick operating snap-action valves. Such valves should be located in an area where the platens cannot be reached while the valve is being operated.

The author is reminded of an accident that resulted in the loss of four fingers to an employee. When the cure was completed he operated the snap-action valve with his right hand. As soon as the press began to open, he reached into the press with his left hand to remove the mold. For some reason he did not remove his right hand from the valve and reversed the position of the valve to close the press, getting his fingers caught between the mold and platen. It should be a strict rule that no attempt be made to reach into a press while it is in motion and certainly some disciplinary action should be taken whenever this rule is violated.

When repairing rams or the ram packing, blocking should be used between the bottom platen crosshead and the lower main crossheads. The laws of gravity respect no man.

The larger presses used for curing belts offer additional hazards inasmuch as auxiliary equipment is used here, for example, overhead cranes, let-off and wind-up stanchions, clamps and stretchers, press irons and wood spreader blocks. In addition, usually an operator and a helper are employed on these presses and whenever such is the case, another accident problem is created.

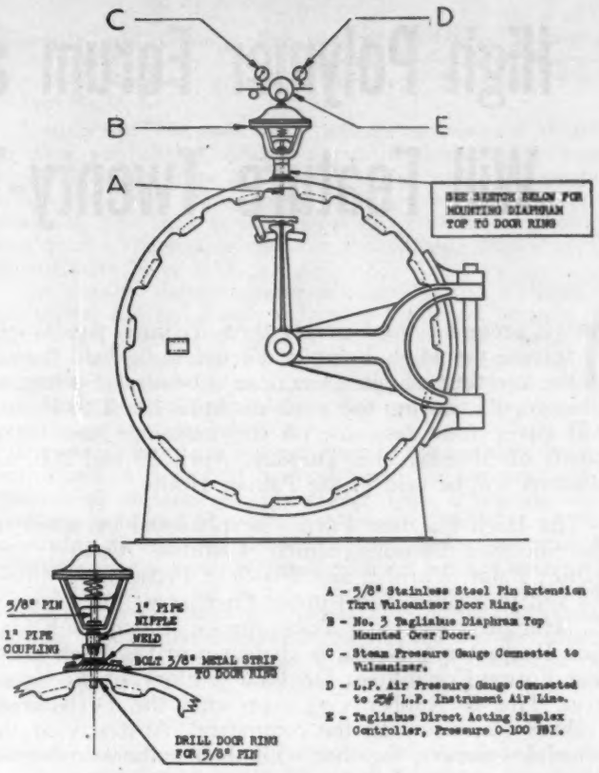
The cranes should be used at all times to place the rolled stock into the let-off stanchion and for the removal of the stock from the wind-up. Never should the stock be permitted to fall out of the wind-up. The operator should be sure to lock the collars on the bar chucks of both the let-off and wind-up stanchions to prevent the load from falling out when revolving.

The operator should be solely responsible for the safety of the personnel and the equipment. Having control of all starting equipment he should be sure his helper or anyone else is in the clear when operating the clamp or stretcher. He should be sure that the helper is not making adjustments between the platens to the stock, press irons or the wood blocking while closing the press. He should see that no one is near the wind-up while starting this equipment and he should see that the press irons and wood blocks are placed in the racks when not in use.

Insofar as the large miscellaneous presses are concerned, the same precautions used in the operation of belt presses should be used. The only difference between these and the belt presses is that no clamps or stretchers are used here.

General Safety Rules

In closing the author would like to suggest some safety rules that can be applied to curing press operations.


C
D
B
E
A
SEE SKETCH BELOW FOR MOUNTING DIAPHRAM TOP TO DOOR RING
5/8" PIN
1" PIPE NIPPLE
1" PIPE COUPLING
WELD
BOLT 5/8" METAL STRIP TO DOOR RING
DRILL DOOR RING FOR 5/8" PIN
A - 5/8" Stainless Steel Pin Extension Thru Vulcanizer Door Ring.
B - No. 3 Tagliabue Diaphram Top Mounted Over Door.
C - Steam Pressure Gauge Connected to Vulcanizer.
D - L.P. Air Pressure Gauge Connected to 25# L.P. Instrument Air Line.
E - Tagliabue Direct Acting Simplex Controller, Pressure 0-100 PSI.

This sketch shows the application of the vulcanizer safety door lock as applied to quick opening doors on vulcanizers in operation at U. S. Rubber's Passaic, N. J., plant. The sketch is not drawn to scale.

1. Operate a press only if authorized.
2. Test your mechanical and hydraulic pressure valves at the start of each shift by operating the press empty.
3. Do not reach into the press while it is in motion. If any adjustments are necessary, stop the press.
4. Do not attempt to remove mold from press until press is entirely opened.
5. Be sure everyone is in the clear before closing the press.
6. Use only proper tools (mold bars, hammers, knives, etc.) and keep tools in good condition.
7. Blocks should be placed between platens that are being repaired or cleaned.
8. Inspect hanger brackets frequently for breaks or signs of wear.
9. Report all leaks to your foreman.
10. Keep the floor clean, dry, and free of foreign material.
11. Wear safety shoes to prevent toe injuries.
12. Mark "hot" on hot objects.
13. Molds with broken handles or other defects should be reported.
14. Be sure mold is properly loaded with insert in place before closing the press.
15. Use caution when using air hose. Do not use the air for cleaning your clothes or the equipment.
16. Prevent coming in contact with the hot equipment. Use long sleeve shirts and heat-resistant gloves.

Note: This paper was presented at the Symposium on Safety in Curing Operations held by the Rubber Section, National Safety Council, Chicago, Ill., October 6, 1947.

High Polymer Forum at Chicago, Ill., Meeting Will Feature Twenty-Three Technical Papers

THE presentation of twenty-three technical papers will feature the High Polymer Forum to be held during the meeting of the American Chemical Society at Chicago, Ill., during the week of April 19. The Forum will cover four sessions, on the mornings and afternoons of Monday and Tuesday, April 19 and 20. All sessions will be held in the Palmer House.

The High Polymer Forum is sponsored by seven of the Society's divisions, namely, Cellulose; Colloid; Organic; Paint, Varnish and Plastics; Petroleum; Physical and Inorganic; and Rubber Chemistry. Dr. Maurice L. Huggins, Research Laboratories, Eastman Kodak Co., Rochester 4, N. Y., is chairman of the High Polymer Forum Committee. Dr. Paul J. Flory, of the Goodyear Tire & Rubber Co., represents the Division of Rubber Chemistry on the committee. Abstracts of the scheduled papers, together with their authors and company connections, follows:

ABSTRACTS OF PAPERS

The Influence of Oxygen on Polymerization Reactions. *J. Abere and W. P. Hohenstein (Institute for Polymer Research, Polytechnic Institute of Brooklyn, Brooklyn, N. Y.)*

Polymerization of carefully purified styrene was carried out at various temperatures and in the absence and presence of measured amounts of oxygen.

In the presence of oxygen, inhibition periods were observed which vary with the initial oxygen pressure. A plot of the inhibition period *versus* the square root of the oxygen pressure yields a straight line relationship. After the inhibition period is over, the reactions proceed at a considerably higher rate than corresponding reactions in the absence of oxygen. The conversion now is also approximately proportional to the square root of the initial oxygen pressure. However, the same proportionality holds only to a certain extent if the same square root is plotted *versus* the reciprocal of the viscosity average molecular weight. There is a significant deviation for low initial oxygen pressures.

The results may be explained by the formation of polymeric peroxides, through the copolymerization of styrene and oxygen. The polymeric peroxides decompose soon after they start forming. With decreasing oxygen pressure, the rate of decomposition prevails over the rate of formation and the subsequent reaction follows the kinetics of a free-radical-catalyzed polymerization.

The equation $p^{\frac{1}{2}} = kt$ has been proposed as regulating the length of the inhibition period. (P = initial oxygen pressure, t = length of the inhibition period.) A plot of $\sqrt{O_2}$ *versus* the inhibition period shows that an equation $p^{\frac{1}{2}} = kt + c$ holds better, where c is a term taking into account the decomposition of the polymeric peroxides.

A possible stabilization of the first link of the styrene-oxygen copolymer $\cdot CH(\diamond) - CH_2 - O - O \cdot$ leads to the formation of benzaldehyde and formaldehyde, while the decomposition of the polymeric peroxides leads to ether-type linkages in the hydrocarbon polymer:

$$R_n OO R_m \rightarrow R_nO \cdot + R_mO \cdot \rightarrow R_nOR_x + R_mOR_y$$

Further Work on a General Theory of the Mechanism of Emulsion Polymerization. *William D. Harkins (University of Chicago, Chicago, Ill.).*

In recent work many details related to the general theory of emulsion polymerization developed in this laboratory have been worked out experimentally. Since almost all of the polymer is formed in the polymer-monomer or latex particles it is important to have accurate knowledge of the value of this ratio. In work with S. H. Herzfeld, A Roginsky and M. L. Corrin it has been found that with 2.5, 5.0 and 10.0 per cent as much potassium laurate and nine-fifths as much water as monomer, the ratio is from 2.6 to 2.8 more monomer than polymer, but this ratio decreases rapidly with yield. Since the growth of the polymer particle is initiated in the monomer solubilized in the soap micelle, it is important to know the size of the micelle, which has been worked out with R. W. Mattoon, R. Stearns and R. Mittelmann.

A new X-ray band has been discovered, and this measures the height or thickness of the cylinder, which may be assumed as a model. The thickness of the cylinder as indicated by the Bragg spacing is in Angstroms 29.7, 31.7, 35.3, 40.3 and 47.3 for the normal potassium soaps of the following carbon atom chain lengths: 8, 10, 12, 14 and 16. Thus the thickness of the micelle is twice the length of the soap molecule. The diameter of the cylinder is increased by solubilized hydrocarbon, by the addition of salts, and by penetration of the micelle by an alcohol or amine. The paper discusses the number of polymer particles produced as related to the initial number of soap micelles, the action of free radicals, and other topics which have been the subject of recent investigations.

The Kinetics of Styrene Emulsion Polymerization. *Wendell V. Smith (U. S. Rubber Co., Passaic, N. J.).*

In aqueous emulsions containing relatively few polymer particles the rate of polymerization of styrene is proportional to the number of polymer particles present and is independent of the persulfate concentration. This can best be interpreted as indicating that the average number of free radicals per particle is a constant and equal to one-half. Thus from the rate of polymerization per particle and the concentration of monomer in the particle reported herein, the chain propagation constant for styrene has been calculated to be $3.5 \times 10^{10} \exp(-11{,}700/RT)$ 1. mole^{-1} sec.$^{-1}$.

A study of the number of polymer particles produced has shown that the factors favoring production of a large number of particles are high soap concentration, high persulfate concentration and high temperature. The number of particles produced agrees satisfactorily with the theoretical law

$$N = k\,(\rho/\mu)^{3/5}\,(a_sS)^{3/5}$$

where N is the number of particles formed per cc of water up to the time that the soap is completely adsorbed on the polymer particles, k is a numerical constant with a value between 0.37 and 0.53, ρ is the rate of formation of free radicals per cc of water solution, μ is the rate of increase in volume of a polymerizing swollen polymer particle, a_s is the interfacial area occupied by one gram of adsorbed soap when micelles are present and S is the initial concentration of the soap in the aqueous phase.

Retardation in Friedel-Crafts Polymerization. *Joseph George, Harry Wechsler and H. Mark (Institute of Polymer Research, Polytechnic Institute of Brooklyn, Brooklyn, N. Y.).*

The action of retarders in the Friedel-Crafts polymerization was investigated in mixtures of nitrobenzene and CCl_4 at 27.6° C. Even in the presence of large excess of $SnCl_4$ or concentrated H_2SO_4, amines such as dimethyl- and diethyl-aniline, and mono-,

di-, and tri-n-butyl amines retard the polymerization of styrene and α-methyl styrene.

Towards styrene polymerization, mono-n-butyl- is a weaker retarder than di- and tri-butyl amines and dimethyl aniline which are about equally effective. Towards α-methyl styrene the retarding effect increases in the series:

$$\text{n-Bu amine} < \text{dimethyl aniline} < \text{tri-n-Bu amine} < \text{di-n-Bu amine}$$

The molecular weights of the polymers are the higher the weaker the retarding action of the amine. This suggests that the amine does not interfere with the initiation step but rather with the propagation or cessation.

The complex $SnCl_4 \cdot 2\ (C_4H_9)_2NH$ had the same action as $(C_4H_9)_2NH$ alone at the same molar concentration.

It is suggested that the mechanism of retardation is the following: In the equilibrium

$$SnCl_4 - xNR_3 \leftrightarrows SnCl_4 \cdot xNR_3,$$

only the free amine acts as a retarder, therefore a high F-strain between $SnCl_4$ and the amine will be equivalent to a higher concentration of retarder. The inhibition proper is the conversion of the growing carbonium into an ammonium ion. This too is subject to F strain, which explains why tertiary amines are weaker retarders towards α-methyl styrene than towards styrene polymerizations.

No ammonium compounds could be isolated. The retarding action is stronger the higher the dielectric constant of the medium.

Dimensions of Coiling Polymer Molecules from Viscosity and Light Scattering. ***A. M. Bueche (Cornell University, Ithaca, N. Y.).***

Molecular dimensions of six polystyrene fractions in benzene have been obtained from viscosity and light scattering. It was found that the root mean square, R, of the distance from beginning to end of the polystyrene molecule is approximately equal to the diameter, 2 R_s, of the molecular sphere needed for the explanation of viscosity. The value R = 1110 Å for a molecular weight of one million from light scattering is equal to 2 R_s = 1030 Å from viscosity within experimental error.

The scattering dissymmetry was found to be a linear function of the molecular weight in the molecular weight range studied. This linearity is predicted by theory for linear coiling molecules. Therefore, the data indicate that the polystyrene fractions used were not appreciably branched or cross-linked.

The polystyrene molecules were found to be much stiffer than would be expected from a free rotation model. Assuming this stiffness to be due to hindered rotation this corresponds to an oscillation of 120° around each bond instead of the 360° for free rotation. This stiffness is responsible for the relatively high viscosity of benzene solutions of polystyrene.

Thermodynamic Properties of Dilute Solutions of Spherical Molecules. ***Maurice L. Huggins (Kodak Research Laboratories, Rochester, N. Y.)***

Zimm and the writer have shown that the partial molal entropy of the solvent in a random solution can be expressed as a power series in the concentration, the coefficients being related in a definite way to the sizes and shapes of the component molecules. A general procedure has now been developed for the derivation of the relations between these coefficients and constants measuring the volumes unavailable to the centers of other solute molecules as a result of the presence of individual solute molecules, pairs of them, groups of three, etc. For spherical solutes, these constants have been evaluated and, from them, the first six coefficients have been computed and two more estimated.

An equation has also been derived for the heat of mixing contribution to the activity, for solutions of large spherical molecules, in terms of "contact energies," coordination numbers, the size of the solute spheres, and the concentration. Activity curves arrived at with the aid of these relationships are compared with those corresponding to Raoult's law and with those deduced for solutions of rodlike and randomly-kinked chain molecules.

Viscosity and Osmotic Behavior of Cellulose Acetate in Solvent Mixtures. ***S. G. Weissberg, R. Simha, M. Forsyth, and G. A. Hanks (National Bureau of Standards, Washington, D. C.***

A study has been made of the osmotic and viscosity behavior of dilute solutions of cellulose acetate fractions with molecular weights ranging from 24,000 to 110,000. Solvent composition was varied from pure acetone to 60 percent by volume of methanol. This latter composition is very close to the precipitation point. The temperature for the viscosity measurements ranged from 10 to 35° C.

The osmotic slopes decrease first slowly with addition of non-solvent and are sharply reduced for methanol contents exceeding 50 percent. Up to this composition, the changes in intrinsic viscosity also are slight; further increase in the methanol content leads to a sharp decrease. This is consistent with the general parallelism which has been noted between osmotic and viscosity behavior.

The abruptness of the changes observed distinguishes the systems examined from vinyl-type polymers. The temperature coefficients of intrinsic viscosity change from a negative to a positive sign beyond 50 percent non-solvent. The effect of non-solvent on the viscosity slopes near the precipitation point is quite different for these cellulose derivatives and a polymer such as polystyrene. In the former the poorer solvents yield the steeper rise in agreement with observations on related systems. In order to assess the influence of the residual hydroxyl groups on the behavior of the systems, it would be of interest to examine solutions of fully esterified samples in suitable solvent mixtures.

Remarks on Interaction of Polymers with Vapors. ***John W. Rowen and Robert Simha (National Bureau of Standards, Washington, D. C.)***

In considering sorption processes, the idea has been expressed that the combination of water and other vapors with certain absorbents is more nearly an adsorption phenomenon in the limit of low vapor pressure, whereas in the opposite limit of high vapor pressure, the process might be more appropriately treated as a "solution" phenomenon. Consequently, adsorption isotherms of cellulose, cellulose derivatives, wool and silk with water and organic vapors and their variations with temperature were analyzed on the basis of adsorption theory on the one hand and current theories of solutions of large molecules on the other.

Examination of the appropriate functions indicates that for the high vapor pressure ratios ($p/p_o > 0.6$), a description in terms of solution theory becomes possible. For cellulose and the protein systems, the characteristic interaction parameters are larger than those ordinarily obtained by solution methods or otherwise for polymer-solvent or polymer-plasticizer systems. The magnitude of the temperature coefficients seems to indicate that this is caused by a comparatively low entropy of mixing. For the cellulose nitrate-acetone system on the other hand, the values are in reasonable agreement with those obtained from osmotic data.

Various alternatives of introducing a swelling term into the expression for the activity may be considered. If the crystalline polymer is represented as a network of elastic springs, one deduces from the high pressure end of the isotherm "elastic moduli" of the order of 10^8 to 10^9 dynes cm.$^{-2}$ for cellulose.

Water Absorption of Proteins. III. Contribution of the Peptide Group. ***Edward F. Mellon, Alfred H. Korn and Sam R. Hoover (Eastern Regional Research Laboratory, Philadelphia 18, Penna.).***

As one part of a systematic study of the role of polar groups in the vapor-phase water absorption of proteins, the water-absorbing properties of a series of glycine peptides have been studied. The shorter peptides, diglycine and triglycine, do not absorb water, thus having the nonhydroscopic tendency of glycine. Higher peptides of glycine, however, show a definite absorption, the percentage absorbed increasing from tetraglycine to hexaglycine. When tetraglycine was benzoylated to block the water-absorbing tendency of the amino chain end, it still absorbed water, although to a less degree.

Polyglycine polymers of 44 and 59 units in length were therefore prepared, and their vapor-phase water absorption was studied. On a weight basis the absorption isotherms were almost

identical, and on a molar basis it was clear that the peptide groups were primarily responsible for the absorption of these materials. When compared with the absorption isotherm of silk, which contains few polar side groups, it was obvious that the peptide chain in the glycine polymers was absorbing almost the same amount of water as the peptide backbone in silk. If we assume that the peptide chain in any protein absorbs the same amount as the polyglycine chain, the peptide chain accounts for 46% of the water absorbed by casein and 70% of the water absorbed by zein at 60% relative humidity.

Absorption data on polyglycine and proteins when plotted as log of the absorption vs. relative humidity are linear over the range 30 to 80% relative humidity, and in some cases beyond 93%. The utility of this relationship will be discussed.

Physical Properties of Chlorotrifluoroethylene Polymers as a Function of Molecular Weight. I. Molecular Weight of Chlorotrifluoroethylene Polymer. ***James L. Gabbard, E. S. Amis, V. E. Anderson and R. L. Cooley (Clinton Engineer Works, Carbide and Carbon Chemicals Corp., Oak Ridge, Tenn.).***

The molecular weight of a randomly selected lot of chlorotrifluoroethylene polymer was determined by the ebulliometric method with both benzene and carbon tetrachloride as solvents. The modified Menzies-Wright molecular weight apparatus was used for the molecular weight measurements in solutions up to thirteen weight percent of the polymer and the modified Cottrell apparatus was used for the molecular weight determinations in the more concentrated solutions.

These molecular weight values, when plotted vs. the weight percent of the polymer in solution, give a curve somewhat S-shaped which can be divided into three distinct sections.

The part of the curve averaging the data for the molecular weight values in concentrations less than 10 weight percent is exponential. The equation representing this part of the curve is $M = A^w + 845$, where M is the molecular weight of the polymer, w is weight percent of the polymer, and A is a constant, equal to 1.447.

The curve for concentrations of the polymer above 10 weight percent shows the molecular weight to increase directly with increased weight percent to an approximate concentration of 55 weight percent. The equation for the molecular weights along this section of the curve is $M = 10w + 783$.

At approximately 55 weight percent of the polymer the curve averaging the molecular weight data is slightly curved and the data from 55 to 65.8 weight percent, the maximum concentration investigated, falls reasonably well along a second straight line. The equation for the molecular weights along this section of the curve is $M = 4.545\ w + 1089$.

The assumed correct molecular weight of the randomly selected lot of the polymer, is the extrapolated value determined at zero concentration of the polymer in benzene and is 846 ± 5 molecular weight units.

The variation of the molecular weight of the polymer in benzene solutions as a function of concentration is attributed to differences in internal pressures and polarities of solute and solvent. (Note: This report is based on work performed under Contract No. W-7405-Eng-26 for the Atomic Energy Commission.)

Physical Properties of Chlorotrifluoroethylene Polymers as a Function of Molecular Weight. II. Molecular Fractionation, Density, Viscosity, Molecular Weight and the Correlation of these properties of Chlorotrifluoroethylene Polymers. ***James L. Gabbard, E. S. Amis, J. R. Hendrickson, N. C. Orrick, J. F. Dietrich, F. V. Williams, A. J. Quinton, R. Alvarez, W. W. Lamarr, V. E. Anderson, R. L. Cooley, and J. W. Grisard. (Clinton Engineer Works, Carbide and Carbon Chemicals Corp., Oak Ridge, Tenn.).***

A number of randomly selected samples from different lots of chlorotrifluoroethylene polymer were separated by the use of falling-film type molecular stills into fractions with molecular weights ranging from approximately 400 to 1300. Family trees of each sample, showing its physical properties, are presented.

The densities, viscosities, and molecular weights of the various fractions were determined with a high degree of accuracy. These data are presented and are correlated graphically.

Empirical equations were derived which accurately express the relationships between density and molecular weight, viscosity and molecular weight, and viscosity and density of the respective fractions. The deviations of the calculated from the observed values for a number of randomly selected fractions are shown in tables. (Note: This report is based on work performed under Contract No. W-7405-Eng-26 for the Atomic Energy Commission.)

Heats of Polymerization. IV. Copolymerization. ***L. K. J. Tong and W. O. Kenyon (Kodak Research Laboratories, Rochester, N. Y.).***

Polymerizations were studied by measuring the heat evolution in an isothermal calorimeter using the following pairs of monomers: (1) vinyl acetate-diethyl fumarate, (2) vinyl acetate-diethyl maleate, (3) vinyl acetate-maleic anhydride, and (4) isopropenyl acetate-maleic anhydride.

The results showed that in cases (1), (2) and (3), in an excess of vinyl acetate, true copolymers of 1:1 ratio were formed until the other components were exhausted before homopolymerization of vinyl acetate occurred. This transition showed up in cases (1) and (3) as a second induction period in the rate of heat evolution. The heat evolved in the first stage was found to be proportional to the amount of smaller component present. This, and other evidence, indicated that in all of the systems studied the copolymers have alternating units.

The heat of copolymerization ($-\Delta H_{cop.}$) is defined as the amount of heat evolved in kcal./mole of mixed monomers polymerized when their ratios are 1:1. The following values for $-\Delta H_{cop.}$ were obtained:

(1) 18.6 ± 0.3
(2) 20.0 ± 0.2
(3) 20.2 ± 0.4
(4) 17.8 ± 0.4

The difference between the values for (1) and (2) is smaller than one half the heat of isomerization of maleic to fumaric esters, suggesting that different stereoisomers are produced in the two cases.

Volume-Temperature-Molecular Weight Relations for Polystyrene. ***Thomas G. Fox, Jr., and Paul J. Flory (Goodyear Research Laboratory, Akron, Ohio).***

Specific volumes of polystyrene fractions ranging from 3700 to 237,000 in molecular weight, and specific volumes of their mixtures, have been measured as functions of temperature from —27 to 217° C. The critical temperatures, T_c, at which the slope of the V-T relationship increases abruptly, may be represented to good approximation by the empirical relationship

$$T_c = 90° - 1.3 \times 10^5 / \overline{M^2}_n$$

where M is the number average molecular weight. At temperatures above T_c the volume-temperature molecular weight relationship assumes the form

$$V = Vo\ (1 + \alpha T) + C / \overline{M^2}_n$$

Re-examination of previously reported plots of the apparent activation energy for viscous flow E_T ($= d\ln \eta / d\ (1/T)$ at the temperature T) versus temperature reveals a similar dependence of the temperature displacement ΔT_E required to superimpose the data for a polystyrene of molecular weight M on those for $M = \infty$. Thus,

$$\Delta T_E = 1.3 \times 10^5 / \overline{M^2}_n$$

the molecular weight dependent term common to both relationships is experimentally negligible for $M > 25{,}000$. These observations support the contention that the "transition" in polymers depends on kinetic factors. It does not, however, occur at a characteristic value of the macroscopic viscosity.

Although addition of a monomeric diluent markedly lowers T_c, the change appears to be smaller than would be predicted, according to the above relationship, from the number average molecular weight of the solvent-polymer mixture.

The Volume of Material Acting as Elementary Moving Unit In the Viscous Deformation of Polymers, and Its Relation to an Activation Energy of Flow. ***D. R. Morey (Kodak Research Laboratories, Rochester, N. Y.).***

The usual activation energies of flow, for polymers, are found to have values ranging from 20 to nearly 200 kilocalories per mole—well into and above the values for primary bond rupture. Viscous flow, however, involves secondary bonds of only 1 to 4 kcal. per mole and hence the process involves the co-

ordinated breaking of a large number of these small bonds. These are pictured as being distributed over the surface of a quite sizable aggregate which holds together as a unit in the internal rearrangements of viscous flow.

Postulating such aggregates, a mechanical process is proposed for the primal or elementary step of viscous flow, and its analysis leads to the following expression for viscosity:

$$\eta = \frac{BV^{2/3}}{T\,(E - 2.6 \times 10^7\ SV^{2/3})}\ \exp\left(\frac{E - 2.6 \times 10^7\ SV^{2/3}}{RT}\right)$$

wherein V is the actual volume of the moving aggregate, E the activation energy for the process, and S the tensile stress applied to the specimen. The process consists of (1) the absorption of thermal energy in the surface groups contributing to the total E value; (2) the breaking loose of the aggregate from its neighbors, when this amount absorbed, plus that furnished by the applied stress, exceeds E; (3) a forward velocity for a time τ, τ being made proportional to the excess energy. This velocity is inversely proportional to the mass of the aggregate.

The expression for η is seen to reduce to the usual Arrhenius formula for small molecule liquids, and also, by the appearance of S, to account for the non-Newtonian behavior so characteristic of polymers. It is also quite similar to a reduced form of the Eyring viscosity equation. The derivation is of particular value in establishing an approach, through the dynamics of the process, to the actual mass of the flow aggregate.

The actual application of the expression to date takes three separate forms according as one assumes V to be independent of S and T or dependent upon either one. E and V values are calculated from experimental data on films of polyvinyl acetate, and it is shown how from experiment one can determine the dependence of V upon stress or temperature.

Refractometric Determination of Second-Order Transition Temperatures, *Richard H. Wiley and G. M. Brauer (University of North Carolina, Chapel Hill, N. C.).*

In a previous paper [*J. Polymer Science,* Vol. 2, p. 10 (1947)], a refractometric method was described for determining the temperature at which the second-order transition, T_m, occurs in polyvinyl acetate. The observed value agreed with the value obtained by other methods. The convenience with which the measurement can be made suggested further study to establish the general utility of the method.

This paper reports (1) further development of the experimental technique and (2) refractive index data for a series of acrylate, methacrylate, vinyl chloride, vinylidene chloride, and styrene polymers and copolymers over a range within ± 30 to 50° C. of their respective transition temperatures.

Three types of refractive index-temperature plots are shown by these data. Most of the plots show two linear regions of different slope above and below T_m. On interpolation, the lines intersect at a value chosen as T_m. Two types of deviation from the linear relations are observed near T_m. In some cases, for instance polypropyl methacrylate, a dip occurs at the intersection probably due to a time effect. With others, for instance polystyrene/butadiene (85/15), a gradual curve replaces the sharp intersection of the two lines. Polymers which are plasticized or contain traces of solvents also show this curvature. Another type of plot is obtained with long chain acrylate and methacrylate polymers which are birefringent below T_m. The technique has been demonstrated to be suitable to determinations of T_m down to —55° C.

An Investigation of the Structure of Polymers by Birefringence Studies. Part II. *R. S. Stein and A. V. Tobolsky (The Textile Foundation, Frick Chemical Laboratory, and Plastics Program, Princeton University, Princeton, N. J.).*

In Part I a method for the investigation of the relationship between the structure of polymeric solids and their optical and mechanical properties was proposed and illustrated. It was shown that through simultaneous measurement of birefringence, a configurational property, and stress, a property of both intermolecular interaction and configuration, considerable insight into the molecular processes associated with the changes in the physical properties of polymers may be obtained. This paper is principally concerned with applications of the method, and its extension to several complex systems.

A new autographic relaxometer is described. More data are presented for the elastic polyamide samples studied under Part I. These experiments serve to clarify the nature of the reversible and irreversible stress-temperature curves, and define the accompanying changes in the polycrystalline structure of the polymer.

The somewhat anomalous optical and mechanical properties of unplasticized polyvinyl chloride are interpreted in terms of structural changes. A thermodynamic analysis of the reversible stress-temperature behavior is made using the theory of Elliot and Lippman and the variation in the functions

$$\left(\frac{\partial E}{\partial l}\right)_{P,T},\ \left(\frac{\partial E}{\partial l}\right)_{V,T},\ T\left(\frac{\partial S}{\partial l}\right)_{P,T},\ \text{and}\ T\left(\frac{\partial S}{\partial l}\right)_{V,T},$$

with temperature is calculated. The results are essentially in agreement with those from the stress-optical analysis and prove of interest in the interpretation of the so-called second-order transition.

It is shown that the behavior of polyethylene, practically up to its melting point, is governed by changing distortional energy contribution. The thermodynamic derivatives are also calculated here.

Polymerization Reactions of Ethyl Sorbate. *M. Wesley Rigg and Rudolph Rosenthal (Temple University, Philadelphia 22, Penna.).*

Since little information is available concerning the successful polymerization of ethyl sorbate, a 2,4-hexadienoic ester, it was considered of interest to determine the activity of ethyl sorbate under the influence of various catalysts which are known to cause polymerization; namely, heat, peroxide in bulk, peroxide in solvent, persulfate in emulsion, and low temperature polymerization with BF_3 and $AlCl_3$ as catalysts. It was also deemed of interest to determine if ethyl sorbate would form a copolymer with various olefin monomers; e.g., methyl and ethyl acrylate, diethyl fumarate, methyl crotonate, styrene, vinyl acetate, and isoprene.

Ethyl sorbate was found to form Diels-Alder addition products in good yield with methyl acrylate, ethyl acrylate, and diethyl fumarate, independent of the method of polymerization or catalyst employed. This is in accord with the fact that no catalyst is required for the Diels-Alder reaction. Ethyl sorbate was found to form addition products in poor yield with methyl crotonate and vinyl acetate.

Dimeric and trimeric materials were formed from ethyl sorbate with styrene and isoprene in solvent polymerization. Materials with rubber-like properties were formed by emulsion polymerization of ethyl sorbate with styrene. A very viscous liquid was formed by emulsion polymerization of ethyl sorbate with isoprene.

No polymeric materials were obtained by low temperature polymerization. Upon attempted polymerization of ethyl sorbate, the same dimeric material was obtained from each of the various methods of polymerization, and it would appear that the catalyst had very little, if any, effect upon the product formed.

The Structure of Neoprene. I. The Molecular Weight Distribution of Neoprene Type GN. *W. E. Mochel, J. B. Nichols, and C. J. Mighton (Experimental Station, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.).*

Polychloroprene rubber, Neoprene Type GN, has been fractionated by successive additions of methanol, a non-solvent, to a dilute solution of the polymer in benzene. Following each addition, a lower layer, rich in polymer of higher molecular weight than that in the supernatant layer, was separated, washed to remove low molecular weight polymer and worked up to obtain the fraction. Number-average molecular weight measurements in benzene were made for each fraction using a static type osmometer. Intrinsic viscosities were determined by measurement of reduced viscosities at several concentrations in a modified Ubbelohde viscometer and extrapolation to zero concentration.

Seventeen fractions were obtained, ranging in molecular

weight from 959,000 to below 20,000. Good agreement was obtained for the viscosity-molecular weight relationship

$$[\eta] = KM^a, \text{ where } K = 1.46 \times 10^{-4} \text{ and } a = 0.73.$$

The molecular weight distribution curve for Neoprene Type GN shows a pronounced maximum at 95,000 but has a long extension to molecular weights of over one million, indicating the presence of branched or cross-linked material which is still soluble. The uniformity is somewhat less than that of sol natural rubber, while in shape the neoprene distribution curve resembles more closely that of a peptized natural rubber than fresh sol rubber.

Observed variations in the slopes of the π/c versus c and the η_{sp}/c versus c curves also indicate the presence of branched or cross-linked polymer which is still soluble.

Adsorption Areas in the Soap Titration of Latex for Particle Size Measurement. ***E. A. Willson, J. R. Miller, and E. H. Rowe (B. F. Goodrich Co., Akron, Ohio).***

From conductometric soap titration data and electron microscope counts of brominated latex particles of butadiene-styrene copolymer, the adsorption area of the myristate soap molecule has been calculated to be 59 square Angstroms and the oleate soap molecule to be 47 square Angstroms. These values are roughly twice the magnitude of the assumed adsorption areas of soap molecules used in published papers on soap titration methods of latex particle size measurement.

For each adsorption area determination, a series of five latices having a calculable particle size relationship was prepared by successive seeding. By employing conditions that confined polymer growth to the seed particles, the series of prepared latices had the relative volume average diameters: 1, $5^{1/3}$, $5^{2/3}$, $5^{4/3}$.

With each successive seeding the accuracy of the particle size counts from electron micrographs was improved because the growing particles became more uniform in size and were toughened by cross-linking so that coalescence of flocculated particles was prevented. Consequently, in making a correlation between the volume-area average diameters from electron micrographs and the reciprocals of the millimoles of adsorbed soap per gram of polymer, the values for the larger particle size latices were heavily weighted.

Anionic Redox Activation of Butadiene-Styrene Copolymerization II. Effect of Sub-Zero Polymerization on Polymer Properties. ***P. H. Johnson, R. R. Brown, and R. L. Bebb (Firestone Tire & Rubber Co., Akron, Ohio).***

Copolymerization of butadiene and styrene in an unmodified redox activated system has been carried out at temperatures ranging from —40° to +40° C. Only minor adjustments in the recipe were made for sub-zero polymerizations, and glycerine was used as an antifreeze when necessary. The temperature of polymerization influenced the properties of the polymer and their vulcanizates. Low polymerization temperatures produced elastomers with improved processibility and uniform mill breakdown characteristics. Modulus decreased with a reduction in reaction temperature, suggesting the possibility of producing rubbers with a desired modulus value. X-ray diffraction pattern on stretched samples showed a greater degree of orientation on polymers produced at low temperatures.

Some Aspects of the Photo-Oxidation of Rubber. ***Donald J. Metz and Robert B. Mesrobian (Institute of Polymer Research, Polytechnic Institute of Brooklyn, Brooklyn, N. Y.).***

Stress relaxation studies of rubber vulcanizates held at constant extension have been recently described for measuring the rate of chain scission at elevated temperatures. In the present studies it has been observed that light in the wave length region of 3000 to 4000 Å greatly accelerates the relaxation process. By use of the rotating sector technique it is found that the intermediates of the rate controlling process have lifetimes on the order of 30 seconds at 50°C. A chemical mechanism for the scission reaction based on the formation of steady state concentrations of hydroperoxide intermediates is discussed. The presence of steady state hydroperoxide concentrations during the oxidation of hydrocarbons is indicated from studies of the catalyzed oxidation of 1,3 dimethyl cyclohexane.

Degradation and Stabilization of Polyvinyl Chloride. ***V. Warren Fox, J. G. Hendricks and H. J. Ratti (National Lead Co., Brooklyn, N. Y.).***

The deleterious action of heat and light promotes changes in the color and physical characteristics of unstabilized polyvinyl chloride that are sufficient to prohibit its use in many otherwise wholly desirable applications. Although, heretofore, stabilization of polyvinyl chloride plastics has been an art, some supporting evidence is available for a hypothesis to be advanced in the interests of discussion and future research.

The individual effects of heat and light in inducing polyvinyl chloride breakdown are considered in some detail. The contributing effects of plasticizers used are also treated as an important, although secondary, consideration in the ultimate heat and light resistance of polyvinyl chloride. On this basis a useful classification of plasticizers is suggested. The role of heat degraded structures on the light stability of the polymer is indicated.

The following ideal stabilizing system for polyvinyl chloride plastics is suggested:

1. Agents capable of removing HCl formed as insoluble products.
2. Reactive molecules capable of breaking up color-producing polyene systems.
3. Selective ultra-violet absorbers (screening agents) capable of reducing the total ultra-violet energy of incident light.
4. Selective agents capable of inhibiting reactions initiated by the passage of unscreened ultra-violet light energy.

Supporting experimental data is offered.

Patent Developments in Polyisobutylene. ***Vanderveer Voorhees (Standard Oil Co. of Indiana, Chicago, Ill.).***

A brief historical sketch is presented of the polymerization of isobutylene to polymers of intermediate and high molecular weight. The more important patents are discussed, starting with the patent of Weizmann and Legg in 1920 showing polymerization in the liquid phase and tracing the development through synthetic lubrication oils (about 1931), viscous semi-solids and elastomers (about 1935) and finally vulcanizable rubber by copolymerization with diolefines (about 1942). The control of molecular weight by temperature during polymerization is the subject of numerous patents. Other patents relate to stabilization, methods of handling, co-polymerization with unsaturated substances, catalysts, etc. Of more than 200 patents, over half are on uses of the polymer.

Adjustment of packing while under pressure and quick connection or disconnection are two features of a new **steam system coupling** recently introduced by the Hansen Manufacturing Co., Cleveland 11, Ohio. Another feature is a smooth, unrestricted bore. Two different types of couplings, one for low and the other for high pressures, carry steam up to 350 psi gauge (saturated). To make connection, it is only necessary to push the plug into the socket, where it locks until released by slight movement of the socket sleeve.

Jacuzzi Bros., Inc., Richmond, Calif., have announced a new series of **boiler feed pumps** especially designed for pumping hot water and for other installations requiring high water pressure. The new units are said to be the first boiler feed pumps produced in a vertical design, the new design cutting to a minimum the floor space required and eliminating the need for special foundations or flexible couplings.

A positive method for preventing reverse rotation on conveyor drives, elevator head shafts, windlasses, winches, and other applications where reverse rotation should not occur, is said to be provided in a **backstop** recently introduced by the Falk Corp., Milwaukee 8, Wisc. The gripping action of the new backstop is said to take place at the precise moment that forward rotation ceases.

Editorials . . . . . .

Rubber Act of 1948

THE Rubber Act of 1948 is now law. It contains provisions with which the rubber manufacturing industry will have to live for the next two years. In view of all of the complexities which faced the legislators, and the numerous lobbies which were in action during the framing of the legislation, Public Law 469, its official title, is well written. From the standpoint of the Administration it is acceptable because it adequately provides for national security. From the standpoint of the industry it is acceptable because it finally provides a termination date—June 30, 1950—for the ending of controls.

For the convenience of our readers Public Law 469 is reproduced in full elsewhere in this issue. Briefly, it authorizes the President to exercise allocation, specification and inventory controls of natural and synthetic rubber, and specification controls of products containing natural and synthetic rubber; calls for maintenance of production facilities for synthetic rubber of 665,000 long tons annually, actual or stand-by; requires mandatory consumption of 222,000 tons of synthetic rubber annually; provides for disposition of synthetic rubber facilities, and authorizes dissolution of existing patent pool agreements.

Although representing a tremendous improvement over the initial bill introduced to the House by Representative Shafer insofar as the industry is concerned, the Rubber Act omits two provisions which the industry would have liked to have had included. The first of these was a pricing formula for GR-S, and the second was the inclusion of a provision making it mandatory for the administering agency to work closely with a rubber industry advisory committee. On the first score, the industry would prefer to have the selling price of GR-S reduced, especially since it maintains that production costs permit of such reduction. The legislators, however, were convinced that the inclusion of a specific pricing provision in the law would make pricing too elastic, and accordingly skirted the issue. On the second point, the legislators did not wish to tie industry too closely with government administration, and accordingly included a recommendation that the administering agency work closely with an industry advisory committee, but did not make such action mandatory.

Although the new rubber legislation provides for specification control over all types of rubber products, rather than only transportation items, particularly tires, camelback and flaps, as requested by industry spokesmen, it is believed that mandatory use of synthetic rubber will be confined to the transportation field, mainly tires and tubes, as at present. The Rubber Division of the Office of Materials Distribution of the Commerce Department, the present administering agency of Rubber Order R-1, is currently drafting a complete revision of that order.

In accordance with Public Law 469, Rubber Order R-1 will be switched over from a natural rubber to a synthetic rubber basis, although the change-over will be largely a play on words. For example, the present order specifies that popular size passenger tires may not contain more than 23% of natural rubber. The revised order is expected to specify that such tires must contain at least 68% of general purpose synthetic rubber. Butyl rubber consumption will continue to be absorbed in inner tubes. However, whereas truck and bus tubes can now be made with natural rubber the new order is expected to specify that such tubes will have to be made entirely of butyl rubber. On the other hand, passenger car tubes, which now must use only butyl rubber, will be permitted to be made with natural rubber. Some difficulties with butyl tubes in cold climates have been reported.

The forthcoming revision is also expected to end the last control measure over consumption of natural rubber latex. This control now provides that auto topper pads, used in auto seat cushions, contain no more than two-thirds of natural latex. No reimposition of inventory controls is anticipated, but import controls barring the import of rubber articles which are not made under the same restrictions as those imposed on domestic manufacturers will be continued.

The new provisions outlined above are expected to insure minimum consumption of 200,000 long tons of general purpose and 22,000 tons of special purpose synthetic rubber, as provided in the Rubber Act of 1948. There is little doubt, however, that actual consumption, irrespective of the natural rubber supply situation, will run considerably higher. The constant development of new and improved synthetic polymers assures the permanent position of synthetic rubber in the nation's economy.

PRESIDENT SIGNS COMPROMISE RUBBER BILL KEEPING U. S. IN SYNTHETIC RUBBER INDUSTRY

THE Rubber Act of 1948 (Public Law No. 469) was signed by President Truman on March 31, two hours before existing controls expired. The new legislation, which insures the government remaining in the synthetic rubber industry until June 30, 1950, represented a compromise between the bills introduced by Representative Shafer in the House and Senator Bricker in the Senate. One of the major compromises was concerned with the declaration of policy, the conferees adopting the principle that "the security interests of the United States will best be served by the development of a free, competitive synthetic rubber-producing industry, and that government ownership of synthetic rubber-producing facilities, regulations requiring mandatory use of synthetic rubber, government production of synthetic rubber and patent pooling should be ended whenever consistent with national security." The House bill, as originally passed, provided that the government retain its synthtic rubber-producing facilities. The Senate amendment provided for the termination of such control "at the earliest practical date." The new language represents the compromise.

Basically, the new legislation extends government control over the rubber industry for another two years, requires changing Rubber Order R-1 from a "natural rubber" to a "synthetic rubber" basis, makes possible the relatively early disposal of some synthetic rubber producing facilities, assures the minimum consumption of 222,000 tons of synthetic rubber, and presages the early dissolution of the present patent pool. Public Law No. 469 is reproduced in full elsewhere in this issue for the benefit of our readers. Highlites of the legislation follow:

Highlites of the Legislation

(1) Directs retention in production or stand-by condition 600,000 long tons of general purpose synthetic and 65,000 tons of special purpose synthetic rubber. Of the latter, 45,000 tons must be suitable for manufacturing inner tubes. Facilities in Government or private operation must produce at least one-third of the 665,000 tons annually. Plants outside the 665,000-ton required capacity may be disposed of permanently with approval of the National Security Resources Board.

(2) Requires the industry to consume 200,000 tons of GR-S and 22,000 tons of special purpose synthetic rubbers annually.

(3) Authorizes the President to exercise allocation, specification and inventory controls of natural rubber and synthetic rubber, and to insure the consumption of general purpose and special purpose synthetics in the amounts specified.

(4) Directs the establishment of adequate governmental research facilities and encourages private research.

(5) Requires the President to appoint an agency which will have the power to produce and sell synthetic rubber in quantities within provisions of the law.

(6) Authorizes the President to place in adequate stand-by condition such rubber producing facilities as he may consider necessary within the provisions of the act.

(7) Directs the agency designated by the President to carry out the terms of the act to undertake an immediate study, conducting such hearings as may be necessary, to determine and formulate a program for disposal to private industry of government-owned rubber-producing facilities and to make a report on such a disposal program to the President and the Congress not later than April 1, 1949.

(8) Requires the President to take immediate steps for the dissolution of patent pooling, patent licensing and other agreements entered into during the wartime period.

(9) Authorizes the President to impose such import restrictions as he thinks necessary to assure equality with like or similar rubber products produced within the United States. The President may exempt from the regulations issued under the act finished and semi-finished products manufactured for export.

Executive Order Issued

Immediately following passage of the Rubber Act of 1948, President Truman issued Executive Order 9942, effective April 1, specifying the following:

1. The Secretary of Commerce shall perform and exercise the functions, duties, powers, authority, and discretion (hereinafter collectively referred to as functions) vested in the President by sections 3, 4, 18 (c) and 18 (d) of the Rubber Act of 1948.

2. The Reconstruction Finance Corporation shall perform and exercise the functions vested in the President by, or designated in sections 5 (c), 5 (e), 6, 7, 8, 11 (a), and 18 (f) of the Rubber Act of 1948; Provided, That the provisions of this paragraph which relate to section 6 (a) of the said Act shall not be construed as precluding any other agency of the Government from engaging in research or development authorized by law.

3. The Secretary of Commerce shall in respect of the functions covered by paragraph 1 of this order and related functions under the Rubber Act of 1948, and the Reconstruction Finance Corporation shall in respect of the functions covered by paragraph 2 of this order and related functions under said Act, perform and exercise the functions of the President (including power of subpena) under sections 10 and 12 of the said Act.

Amendment to Rubber Order

In keeping with the new legislation, the Office of Materials Distribution of the Department of Commerce issued Amendment No. 3 to Rubber Order R-1, as Amended February 12, 1948, which simply changed the first paragraph of Part 4600 of the order to read as follows: "The following order is deemed necessary and appropriate to strengthen national security and the common defense by providing for the maintenance of an adequate domestic rubber-producing industry and to carry out the purposes of the Rubber Act of 1948, Public Law No. 469, 80th Congress, approved March 31, 1948."

It was later explained by an official of OMD's Rubber Division that since the new legislation provides for control over both natural and synthetic rubber, all of the terms of the present Rubber Order R-1 are still in effect and will remain in effect until a specific revision or series of amendments is issued. It was further indicated that a revision of the order will be forthcoming in the next few weeks.

According to present indications, the revised rubber order will confine the mandatory use of synthetic rubber to the transportation field, largely in tires and tubes, as at present, although a change in specifications is expected. It is also expected to require that all truck and bus tubes be made entirely of butyl, but will cut the required amount of butyl in passenger car tubes. The forthcoming order will probably eliminate all controls over natural rubber latex.

Reaction of the Industry

Early comment on the new legislation indicated that the industry "could live with it" while administration officials were satisfied that it "meets with the requirements of national security." In general, industry agreed that the fact that the law provided a return to a competitive instead of a regimented basis beginning definitely on June 30, 1950, made the law "livable."

According to John L. Collyer, president

of the B. F. Goodrich Co., the immediate cessation of further pooling of patents and technical information under wartime agreements, which the new law directs, "will furnish the incentive needed for the discovery and production of new and better man-made rubbers." Mr. Collyer called this incentive "a vital objective in the strengthening of the national defense."

Prior to the passage of the legislation by both houses of Congress, it was learned that George P. Bunn, an official of the Phillips Petroleum Co., had sharply criticized the Bricker Bill in a letter to Senator Bricker. Mr. Bunn particularly objected to the provision permitting only the government to supply general purpose synthetic rubber pointing out that this provision "stifles any private rubber production of consequence because required uses cannot be expected to consume more than the mandatory rubber."

Mr. Bunn also opposed immediate termination of patent and other exchange agreements "as long as the government continues to run the synthetic rubber industry." He decidedly favored the ending of such agreements "as soon as the plants are in private hands." According to reports, Phillips Petroleum, which now operates a butadiene plant, is interested in the acquisition of both a styrene and a copolymer plant, providing a truly free and competitive market can be established.

Neoprene Negotiations Continue

The long-term negotiations between E. I. du Pont de Nemours & Co. and the War Assets Administration for sale of the $25,000,000 neoprene plant at Louisville, Kentucky, were recently transferred to the Reconstruction Finance Corp. DuPont has offered a maximum of $12,200,000 for the plant and WAA has been holding out for $16,631,030. The matter is of special interest, since DuPont is the only organization that has publicly offered to purchase a specific government-owned synthetic rubber plant. The DuPont-owned neoprene plant at Deepwater, N. J., has a capacity of 6,000 tons annually. The Louisville plant has a capacity of 60,000 tons. RFC is expected to bring the negotiations to an early conclusion. Under the new rubber legislation, it has the authority to sell the plant, subject to Congressional approval.

Venuto Lectures on Black

L. J. Venuto, of the technical department of the Binney & Smith Co., New York City, delivered a lecture at the Polytechnic Institute of Brooklyn, Department of Chemical Engineering, and at the Division of General Education, New York University, on "The Manufacture and Use of Black Pigments," on February 20 and March 9, respectively. Most of the talk was based on the fundamental, chemical and physical properties of all carbon blacks with emphasis on the properties and uses as referred to paint and other protective coatings. Mr. Venuto also give the history of carbon black, showing the changes in production up to present day methods.

Stokes Addresses Engineers

C. A. Stokes, director of research and development for Godfrey L. Cabot, Inc., addressed the Akron Section of the American Institute of Chemical Engineers at Akron, Ohio, on March 18. Mr. Stokes traced the manufacture of various types of carbon black and stated that the use of petroleum oils in conjunction with natural gas in a furnace type process offers the best promise of giving the United States a continuing supply of highly reinforcing furnace black at price levels near those now prevailing for channel black. If petroleum oils become too scarce or too high priced, he said, carbon black can be made from coal products by various methods.

Carbon Black Prices Increased

Effective April 1, the price of channel black was increased by all manufacturers by ½c a pound. The latest quotation ranges from .0732 cents to .1175 cents a pound, these prices covering bags in carlots to less-than-carlots. The price of furnace black remains, for the most part, at .05 to .09 cents a pound. Bulk prices of channel blacks are somewhat less than the bag quotations.

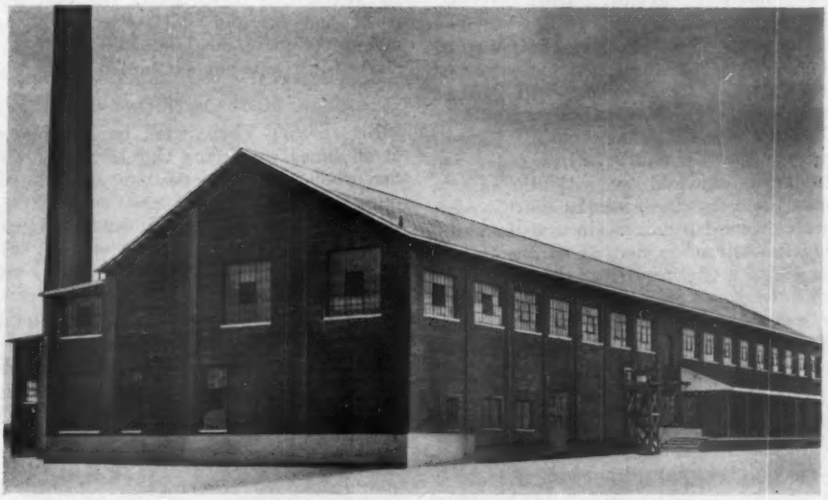
JANUARY CASING PRODUCTION DECLINES FROM DECEMBER TOTALS

According to the Rubber Manufacturers Association, the production of automotive casings was off slightly in January from December levels. Production of passenger casings was 6,438,655 units in January, and 6,622,352 units in December. Truck and bus casings produced in January totalled 1,411,967 units, against 1,427,429 units in December. Total automotive casings produced in January totalled 7,850,622 units, which compared with 8,049,781 units for December.

Shipments of automotive casings in January totalled 5,919,026 units, while 6,582,645 units were shipped in December. Of these totals, 4,737,098 passenger casings were shipped in January, and 5,336,283 casings were shipped in December. Truck and bus casings shipped in January came to 1,181,928 units, as against 1,246,362 casings in December.

A total of 6,225,651 passenger and truck and bus tubes were produced in January. This compares with 6,543,644 units produced in December. Passenger and truck and bus tubes shipped in January totalled 5,152,463 units. Tubes shipped in December amounted to 5,324,193.

YALE RUBBER COMPANY PURCHASES PLANT IN SANDUSKY, MICHIGAN



New building of the Yale Rubber Manufacturing Co. at Sandusky, Michigan

The Yale Rubber Manufacturing Co., Yale, Michigan, has purchased the former Cecil Products Co. building in Sandusky, Michigan, adding more than 36,000 square feet of manufacturing space to its present facilities. Installation of new machinery for the production of rubber parts will begin immediately in the new plant, company officials stated. Contracts are now being negotiated for the construction of an additional 80 x 100 foot building which will house new Banbury mixers and milling equipment.

Formed only three years ago, Yale Rubber specializes in the manufacture of molded rubber products and bonding rubber to metal, in addition to a complete line of mechanical rubber goods. Sales effort has been directed largely to industrial firms in Michigan and adjacent areas.

Company officials are E. H. Henderson, president; J. B. Spurlock, plant manager; R. G. Schrope, production manager; Anton Rizzardi, personnel manager; K. W. Stevens, chief chemist; Russell C. Henderson, assistant secretary and treasurer. In addition to the plants at Yale and Sandusky, the company maintains a branch sales office and warehouse in Detroit, Mich., at 1433 Holden Ave., under the supervision of Walter D. Hough, secretary.

COMPLETE TEXT OF RUBBER ACT OF 1948—PUBLIC LAW 469

Following is the full text of Public Law 469, also known as the "Rubber Act of 1948," signed on March 31, 1948 by the President, and effective from April 1, 1948 until June 30, 1950:

[PUBLIC LAW 469—80TH CONGRESS]
[CHAPTER 166—2D SESSION]
[H. R. 5314]

AN ACT—To strengthen national security and the common defense by providing for the maintenance of an adequate domestic rubber-producing industry, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Rubber Act of 1948."

DECLARATION OF POLICY

SEC. 2. It is the policy of the United States that there shall be maintained at all times in the interest of the national security and common defense, in addition to stock piles of natural rubber which are to be acquired, rotated, and retained pursuant to the Strategic and Critical Materials Stock Piling Act (Public Law 520, Seventy-ninth Congress, approved July 23, 1946), a technologically advanced and rapidly expandible rubber-producing industry in the United States of sufficient productive capacity to asure the availability in times of national emergency of adequate supplies of synthetic rubber to meet the essential civilian, military, and naval needs of the country. It is further declared to be the policy of the Congress that the security interests of the United States can and will best be served by the development within the United States of a free, competitive synthetic-rubber industry. In order to strengthen national security through a sound industry it is essential that Government ownership of production facilities, Government production of synthetic rubber, regulations requiring mandatory use of synthetic rubber, and patent pooling be ended and terminated whenever consistent with national security, as provided in this Act.

AUTHORITY TO EXERCISE CERTAIN CONTROLS OVER NATURAL RUBBER AND SYNTHETIC RUBBER AND PRODUCTS CONTAINING NATURAL AND SYNTHETIC RUBBER

SEC. 3. To effectuate the policies set forth in section 2 of this Act, the President is authorized to exercise allocation, specification, and inventory controls of natural rubber and synthetic rubber, and specification controls of products containing natural rubber and synthetic rubber, notwithstanding any changes in the supply or estimated supply of natural rubber or synthetic rubber; and he shall exercise such controls by issuing such regulations as are required to insure (a) the consumption in the United States of general-purpose synthetic rubber in a specified percentage of the combined total estimated annual consumption of natural rubber and general-purpose synthetic rubber consumed within the United States, and (b) the consumption in the United States of any or all types of special-purpose synthetic rubber in specified percentages of the combined total estimated annual consumption of natural rubber, general-purpose synthetic rubber, and special-purpose synthetic rubber consumed within the United States. Such percentages shall be established so as to assure the production and consumption of general-purpose synthetic rubber and special-purpose synthetic rubber in quantities determined by the President to be necessary to carry out the policy of section 2 of this Act, and the provisions of Public Law 520, Seventy-ninth Congress, approved July 23, 1946: *Provided,* That the minimum percentages established by the President shall result in a total annual tonnage consumption of synthetic rubber of at least the amounts specified in section 5 (d) of this Act, and that any mandatory consumption in excess of the quantities specified in section 5 (d) of this Act shall not be more than is deemed by the President to be necessary in the interest of national security and the common defense.

IMPORTATION AND EXPORTATION

SEC. 4. (a) The President may impose such import restrictions on finished and semifinished rubber products as he deems necessary to assure equality with like or similar products produced within the United States in accordance with regulations issued under this Act.

(b) The President may exempt from the regulations issued under this Act finished and semifinished rubber products manufactured in the United States exclusively for export outside the United States.

DOMESTIC RUBBER-PRODUCING CAPACITY

SEC. 5 (a) There shall be maintained at all times within the United States rubber-producing facilities having a rated production capacity of not less than six hundred thousand long tons per annum of general-purpose synthetic rubber and not less than sixty-five thousand long tons per annum of special-purpose synthetic rubber.

(b) Of the sixty-five-thousand-long-ton rated production capacity for special-purpose synthetic rubber, specified in section 5 (a) of this Act, at least forty-five thousand long tons shall be of a type suitable for use in pneumatic inner tubes.

(c) The synthetic rubber used to satisfy the mandatory consumption provided in section 3 of this Act shall be produced by the Government or for the Government account, or purchased from others for resale by the Government or for the Government account.

(d) Facilities in operation by the Government or private persons shall produce annually not less than one-third of the rated production capacities specified in section 5 (a) and (b) of this Act.

(e) The facilities to be maintained in operation by the Government and those to be maintained in adequate stand-by condition shall be determined from time to time by the President.

(f) At least one facility for making butadiene from alcohol shall be maintained in operation or in adequate stand-by condition.

RESEARCH AND DEVELOPMENT

SEC. 6. (a) To effectuate further the policies set forth in section 2 of this Act with respect to a technologically advanced domestic rubber-producing industry, continuous and extensive research by private parties and the Government is essential. The Government is hereby authorized to undertake research in rubber and allied fields and the powers, functions, duties, and authority of the Government to undertake research and development in rubber and allied fields shall be exercised and performed by such departments, agencies, officers, Government corporations, or instrumentalities of the United States as the President may designate, whether or not existing at the date of enactment of this Act.

(b) The cost of undertaking and maintaining the research and development authorized in section 6 (a) of this Act may be paid from such sums as the Congress, from time to time, may appropriate to carry out the provisions of this Act.

OPERATION OF RUBBER-PRODUCING FACILITIES BY THE UNITED STATES GOVERNMENT

SEC. 7. (a) The powers, functions, duties, and authority to produce and sell synthetic rubber conferred in section 7 (b) of this Act shall be exercised and performed by such department, agency, officer, Government corporation, or instrumentality of the United States as the President may designate, whether or not existing at the date of enactment of this Act.

(b) The department, agency, officer, Government corporation, or instrumentality of the United States designated by the President pursuant to section 7 (a) of this Act shall have the powers, functions, duties, and authority to produce and sell synthetic rubber, including the component materials thereof, in amounts sufficient to assure the production of synthetic rubber as required by the President in section 3 of this Act: *Provided,* That so far as practicable the President shall authorize such production of synthetic rubber, including the component materials thereof, as may be necessary to satisfy voluntary usage of synthetic rubber, including the component materials thereof.

(c) The aforesaid powers, functions, duties, and authority to produce and sell include all power and authority in such department, agency, officer, Government corporation, or instrumentality of the United States to do all things necessary and proper in connection with and related to such production and sale, including but not limited to the power and authority to make repairs, replacements, alterations, improvements, or betterments to the rubber-producing facilities owned by the Government or in connection with the operation thereof and to make capital expenditures as may be necessary for the efficient and proper operation and maintenance of the rubber-producing facilities owned by the Government and performance of said powers, functions, duties, and authority.

(d) Notwithstanding the provisions of this or any other Act, the aforesaid powers, functions, duties, and authority to produce and sell include the power and authority in such department, agency, of-

ficer, Government corporation, or instrumentality of the United States to (1) lease for operation for Government account all or any part of the Government-owned rubber-producing facilities in connection with the performance of said powers, functions, duties, and authority to produce and sell; (2) lease, for a period not extending beyond the termination date of this Act, Government-owned rubber-producing facilities for private purposes if such lease contains adequate provisions for the recapture thereof for the purposes set forth in section 7 (b) of this Act and if such lease provides that any synthetic rubber or component material as may be produced by the leased facilities shall not be used to satisfy mandatory requirements established by section 3; (3) grant permanent easements or licenses for private purposes in, on, or over land comprising part of the Government-owned rubber-producing facilities if such grant provides that such easement or license shall not interfere with the use at any time of the rubber-producing facilities involved; and (4) sell or otherwise dispose of obsolete or other property not necessary for the production of the rated capacity of the particular plant to which such property is charged.

STAND-BY FACILITIES

SEC. 8. (a) To effectuate further the policies set forth in section 2 of this Act, the President is authorized to place in adequate stand-by condition such rubber-producing facilities as he shall determine necessary to maintain the continued existence of rubber-producing facilities capable of producing the tonnage of synthetic rubber required by section 5 (a) of this Act.

(b) Rubber-producing facilities placed in stand-by condition by the President pursuant to section 8 (a) of this Act may be maintained by such department, agency, officer, Government corporation, or instrumentality of the United States, whether or not existing on the date of enactment of this Act, as the President may designate: *Provided,* That nothing contained in section 8 (b) of this Act shall preclude such department, agency, officer, Government corporation, or instrumentality of the United States from entering into contracts with private persons for the maintenance of stand-by facilities: *Provided further,* That the cost of placing facilities in stand-by condition, maintaining such facilities in adequate stand-by condition, and, when necessary, reactivating such facilities, may be paid from such sums as the Congress, from time to time, may appropriate to carry out the provisions of this Act.

DISPOSAL OF GOVERNMENT-OWNED RUBBER-PRODUCING FACILITIES

SEC. 9. (a) The department, agency, officer, Government corporation, or instrumentality of the United States designated by the President pursuant to section 7 (a) of this Act shall undertake immediate study, conducting such hearings as may be necessary, in order to determine and formulate a program for disposal to private industry by sale or lease of the Government-owned rubber-producing facilities other than those authorized to be disposed of pursuant to section 9 (b) of this Act. A report with respect to the development of such a disposal program shall be made to the President and to Congress not later than April 1, 1949. On or before January 15, 1950, the President, after consultation with the National Security Resources Board, shall recommend to the Congress legislation with respect to the disposal of the Government-owned rubber-producing facilities other than those authorized to be sold, leased, or otherwise disposed of under the provisions of section 9 (b) of this Act, together with such other recommendations as he deems desirable and appropriate: *Provided,* That the Government shall maintain the ownership of a rated rubber-producing capacity of six hundred thousand long tons of general-purpose rubber and a rated rubber-producing capacity of sixty-five thousand long tons of special-purpose rubber until a program is formulated and adopted for the sale or lease of such facilities as provided in this section.

(b) Notwithstanding the provisions of this or any other Act, the department, agency, officer, Government corporation, or instrumentality of the United States designated by the President pursuant to section 7 (a) of this Act may, after consultation with the National Security Resources Board, sell, lease, or otherwise dispose of to private persons any rubber-producing facility, including such facilities as have been declared surplus pursuant to the Surplus Property Act of 1944, as amended, not required to fulfill the capacity set forth in section 5 (a) of this Act upon such terms and conditions as it may determine providing that such sale or lease shall be on the condition that any synthetic rubber or component materials produced in such facility shall not be used to satisfy the mandatory requirements established by section 3 of this Act.

ADMINISTRATION

SEC. 10. (a) The President may issue such rules and regulations as he deems necessary and appropriate to carry out the provisions of this Act.

(b) The President may exercise any or all of the powers, authority, and discretion conferred upon him by this Act, including but not limited to the powers and authority conferred in section 12 of this Act, through such departments, agencies, officers, Government corporations, or instrumentalities of the United States, whether or not existing at the date of the enactment of this Act, as he may direct.

(c) The President, insofar as practical, shall consolidate all of the powers, functions, and authority contained in this Act in one department, agency, officer, Government corporation, or instrumentality of the United States, whether or not existing at the date of enactment of this Act. The President is authorized to cause a corporation to be organized for the purpose of producing and selling synthetic rubber. Any such corporation so organized shall be authorized, subject to the Government Corporation Control Act and to pertinent provisions of law affecting Government corporations, to sue and be sued, to acquire, hold, and dispose of property, to use its revenues, to determine the character of and necessity for its obligations and expenditures and the manner in which they shall be incurred, allowed and paid, and to exercise such other powers as may be necessary or appropriate to carry out the purposes of the corporation. The Secretary of the Treasury is authorized, out of appropriations made for that purpose, to subscribe to the capital stock of such corporation.

(d) The President may transfer to the departments, agencies, officers, Government corporations, or instrumentalities of the United States, or to any of them, which he directs to exercise the powers, authority, and discretion conferred upon him by this Act, such rubber-producing facilities, personnel, property, and records relating to such powers, authority, and discretion, as he deems necessary; and he may so transfer all appropriations or other funds available for carrying out such powers, authority, and discretion.

(e) In addition to the reports required by section 9 (a) of this Act, each department, agency, officer, Government corporation, or instrumentality of the United States to whom the President may delegate any powers, authority, and discretion conferred by this Act shall make an annual report to the President and to the Congress of operations under this Act.

PATENT POOLING AND USE OF TECHNICAL INFORMATION

SEC. 11. (a) To effectuate further the policies of this Act, the President is authorized and directed to take such action as may be appropriate with respect to patent pooling, patent licensing and exchange of information agreements entered into with the Government as a part of the wartime synthetic rubber program and, insofar as practicable and consistent with the purposes of this Act, to effectuate immediate cessation of further accumulation of technical information or rights to patents under the agreement dated December 19, 1941, as supplemented June 12, 1942, between the Government and others.

(b) Any department, agency, officer, Government corporation, or instrumentality of the United States as the President may designate to perform the powers, functions, duties, and authority referred to in section 7 (b) of this Act shall be entitled to the benefits of the Act of June 25, 1910 (36 Stat. 851), as amended July 1, 1918 (40 Stat. 705), or any similar Act.

INFORMATION, REPORTS, SUBPENAS, WITNESSES, AND TESTIMONY

SEC. 12. (a) The President shall be entitled to obtain such information from, require such reports and the keeping of such records by, make such inspection of the books, records, and other writings, premises, or property of, any person and make such investigations, as may be necessary or appropriate, in his discretion, to the enforcement or administration of the provisions of this Act.

(b) For the purpose of obtaining any information, verifying any report required, or making any investigation pursuant to section 12 (a) of this Act, the President may administer oaths and affirmations, and may require by subpena or otherwise the attendance and testimony of witnesses and the production of any books or records or any other documentary or physical evidence which may be relevant to the inquiry. Such attendance and testimony of

witnesses and the production of such books, records, or other documentary or physical evidence may be required at any designated place from any State, Territory, or other place subject to the jurisdiction of the United States: *Provided,* That the production of a person's books, records, or other documentary evidence shall not be required at any place other than the place where such person resides or transacts business, if, prior to the return date specified in the subpena issued with respect thereto, such person furnishes the President with a true copy of such books, records, or other documentary evidence (certified by such person under oath to be a true and correct copy) or enters into a stipulation with the President as to the information contained in such books, records, or other documentary evidence. Witnesses shall be paid the same fees and mileage that are paid witnesses in the courts of the United States. No person shall be excused from attending and testifying or from producing any books, records, or other documentary evidence or certified copies thereof, or physical evidence, in obedience to any such subpena, or in any action or proceeding which may be instituted under this Act on the ground that the testimony or evidence, documentary or otherwise, required of him may tend to incriminate him or subject him to a penalty or forfeiture; but no individual shall be subject to prosecution and punishment, or to any penalty or forfeiture, for or on account of any transaction, matter, or thing concerning which he is compelled to testify or produce evidence, documentary or otherwise, after having claimed his privilege against self-incrimination, except that any such individual so testifying shall not be exempt from prosecution and punishment for perjury committed in so testifying. The President shall not publish or disclose any information obtained under this section which the President deems confidential or with reference to which a request for confidential treatment is made by the person furnishing such information, unless the President determines that the withholding thereof is contrary to the interest of the national defense and security; and anyone violating this provision shall be guilty of a felony and, upon conviction thereof, shall be fined not exceeding $1,000 or be imprisoned not exceeding two years, or both.

PENALTIES

SEC. 13. Any person who willfully performs any act prohibited, or willfully fails to perform any act required by any provision of this Act or any rule, regulation, or order thereunder, shall upon conviction be fined not more than $10,000 or imprisoned for not more than two years, or both.

JURISDICTION OF THE UNITED STATES COURTS

SEC. 14. (a) The district courts of the United States, and the United States courts of any Territory or other place subject to the jurisdiction of the United States, shall have jurisdiction of violations of this Act or any rule, regulation, or order or subpena thereunder, and of all civil actions under this Act to enforce any liability or duty created by, or to enjoin any violation of this Act or any rule, regulation, order, or subpena thereunder.

(b) Any criminal proceeding on account of any such violation may be brought in any district in which any act, failure to act, or transaction constituting the alleged violation occurred. Any such civil action may be brought in any such district or in the district in which the defendant resides or transacts business. Process in such cases, criminal or civil, may be served in any district wherein the defendant resides or transacts business or wherever the defendant may be found; and subpenas for witnesses who are required to attend a court in any district in any such cases may run into any other district. No costs shall be assessed against the United States in any proceeding under this Act.

EXCULPATORY CLAUSE

SEC. 15. No person shall be held liable for damages or penalties for any default under any contract or order which shall result directly or indirectly from compliance with this Act or any rule, regulation, or order issued thereunder, notwithstanding that any such rule, regulation, or order shall thereafter be declared by judicial or other competent authority to be invalid.

EXEMPTION FROM ADMINISTRATIVE PROCEDURE ACT

SEC. 16. Functions exercised under this Act shall be excluded from the operation of the Administrative Procedure Act except as to the requirements of sections 3 and 10 thereof.

SEPARABILITY

SEC. 17. If any provision of this Act or the application thereof to any person or circumstance is held invalid, the validity of the remainder of the Act and of the application of such provision to other persons and circumstances shall not be affected thereby.

DEFINITIONS

SEC. 18. For the purposes of this Act—

(a) The term "natural rubber" means all forms and types of tree, vine, or shrub rubber, including guayule and natural rubber latex, but excluding reclaimed natural rubber;

(b) The term "synthetic rubber" means any product of chemical synthesis similar in general properties and applications to natural rubber, and specifically capable of vulcanization, produced in the United States, not including reclaimed synthetic rubber;

(c) The term "general-purpose synthetic rubber" means a synthetic rubber of the butadiene-styrene type generally suitable for use in the manufacture of transportation items such as tires or camelback, as well as any other type of synthetic rubber equally or better suited for use in the manufacture of transportation items such as tires or camel-back as determined from time to time by the President;

(d) The term "special-purpose synthetic rubber" means a synthetic rubber of the types now known as butyl, neoprene, or N-types (butadiene acrylonitrile types) as well as any synthetic rubber of similar or improved quality applicable to similar uses, as determined from time to time by the President;

(e) The term "rubber-producing facilities" means facilities, in whole or in part, for the manufacture of synthetic rubber, and the component materials thereof, including, but not limited to, buildings and land in which or on which such facilities may be located and all machinery and utilities associated therewith;

(f) The term "rated production capacity" means the actual productive capacity assigned to any rubber-producing facilities at time of authorization of construction or as thereafter amended in authorizations of additional construction or alterations thereto and used in published reports and in the records of the Office of Rubber Reserve, Reconstruction Finance Corporation, or successor agency, or privately owned plants, determined by the President based upon operating experience and records as determined from time to time by the President;

(g) The term "component materials" means the material, raw, semi-finished, and finished, necessary for the manufacture of synthetic rubber;

(h) The term "stand-by condition" means the condition in which rubber-producing facilities, in whole or in part, are placed when determined to be not needed for current operations, but are maintained so as to be readily available for the production of synthetic rubber or component materials;

(i) The term "person" means any individual, firm, copartnership, business trust, corporation, or any organized group of persons whether incorporated or not, and except for the provisions of section 13 any Government department, agency, officer, corporation, or instrumentality of the United States; and

(j) The term "United States" includes the several States, the District of Columbia, the Territories of Alaska and Hawaii, and Puerto Rico.

AUTHORIZATION FOR APPROPRIATIONS

SEC. 19. (a) There are hereby authorized to be appropriated such sums as may be necessary and appropriate to carry out the provisions and purposes of this Act.

(b) Until such time as appropriations herein authorized are made, any department, agency, officer, Government corporation, or instrumentality of the United States may, in order to carry out its functions, powers, and duties under this Act, continue to incur obligations and make expenditures in accordance with laws in effect on March 31, 1948.

EFFECTIVE DATE

SEC. 20. This Act shall become effective on April 1, 1948, and shall remain in effect until June 30, 1950.

Approved March 31, 1948.

New GR-S Latices Available

Three experimental GR-S latices were recently promoted by the Office of Rubber Reserve to the GR-S numbered category and are now in actual production. X-359 GR-S Latex is now GR-S Latex Type VI, X-370 GR-S Latex is now GR-S Latex Type VII, and X-270 GR-S Latex is now GR-S Latex Type VIII.

THE PROCESS: Controlled provision for inter-particle collisions during carbon formation.

THE PRODUCT: Optimum development of reticulate chain structure. Carbon fibres to strengthen non-crystalline polymers.

THE RESULT: Better processing and better tubing and calendering.

COLUMBIAN CARBON COMPANY

500 TONS OF SMOKE A DAY

COLUMBIAN CARBON CO. MANUFACTURER

BINNEY & SMITH CO. DISTRIBUTOR

MPC (Medium Processing Channel)

STANDARD MICRONEX

◆

EPC (Easy Processing Channel)

MICRONEX W-6

◆

HMF (High Modulus Furnace)

STATEX-93

◆

FF (Fine Furnace)

STATEX-B

◆

VFF (Very Fine Furnace)

STATEX-K

◆

FEF (Fast Extruding Furnace)

STATEX-M

◆

SRF (Semi-Reinforcing Furnace)

FURNEX

◆

COLUMBIAN CARBON CO. MANUFACTURER

BINNEY & SMITH CO. DISTRIBUTOR

TALKS ON LATEX ADVANCES FEATURE NEW YORK MEETING

Two timely talks on latex featured the Spring Meeting of the New York Rubber Group, held on April 2 at the Henry Hudson Hotel in New York City. Approximately 280 members and guests attended the meeting, which also featured a report detailing the history of the group and several variety vaudeville acts. It was the first time the group had met at the Henry Hudson Hotel and the consensus of opinion approved the new choice.

The first speaker was Dwight L. Allen, sales manager of American Anode, Inc., substituting for Dr. Robert V. Yohe, president of that company, who was unable to present his scheduled paper on "Commercial Aspects of Natural and Synthetic Latices" because of the sudden illness of his father. Mr. Allen read Dr. Yohe's paper, with a few interpolations of his own. In view of the fact that Mr. Allen did not see Dr. Yohe's paper until a half hour before the meeting, he did an excellent job of presentation.

Dr. Yohe's paper first traced the growth of latex consumption, emphasizing the fact that it has increased from 3% of total rubber consumption prior to the war to 4½% at present. Among large volume uses of latices he listed sponge, tire cord dipping, toys and balloons, drug sundries, prophylactics, adhesives, coatings, impregnants and sheetings. It was indicated that it is entirely possible that many products now being made by conventional dry rubber and dry processing methods will be converted to latex processes in the near future.

The advantages of latex in the production of numerous products were outlined in the paper and the point was made that the problem of materially increasing the use of latex, regardless of type, lies first in obtaining it in a price range competitive with dry rubbers; second, development of methods of manufacture which are lower in cost than present dry rubber methods; and third, development of entirely new uses for the latices themselves. The various latices currently available, and their prices, were detailed.

The paper concluded with three predictions: (1) That the price of natural latex will be reduced very soon and will be selling at 25c a pound by year-end; (2) That an American-made butadiene-styrene latex will be developed within two years or less which will be at least a 50% replacement for natural latex for all uses; and (3) That the consumption of latices will be at least 10% and perhaps 20% of the total rubber consumption in the United States within ten years.

Noble Discusses Technology

Dr. Royce J. Noble, executive vice-president of the Heveatex Corp., was the second speaker. Taking as his subject "Recent Developments in Latex Technology," Dr. Noble reviewed technological advances recorded in recent years. He first stressed the special advantages of natural and synthetic latices, such as the high tensile film and high tear resistance offered by the natural product, and the small particle size and oil and freeze resistance featured by the synthetic types. He also referred to some of the war-time experiments with special natural latices, including the Castilloa, Funtumia and Cryptostegia types.

Discussing treatment of the latex itself, Dr. Noble told of recent efforts to find a suitable preservative to replace ammonia which it has been determined has a deleterious effect on the latex in some cases. Chlorinated phenols, he indicated, showed considerable promise as satisfactory replacements. He also urged that more attention be paid by the research experts to the rubber hydrocarbon in the latex rather than to the other substances in the material. Developments in the concentration and creaming of latex were also covered by the speaker, including the so-called reactor concentration of synthetic latex and the electrodecantation method for natural latex.

Continuing, Dr. Noble referred to several new methods which have been developed for the testing of the latices, especially the synthetic types. He stated that standardization of test methods, which was started before the war, is again receiving serious attention. In connection with product developments, the speaker mentioned the Positex method of impregnating fibers, which is rapidly gaining hold in England, and the use of carbon black as a reinforcing agent for synthetic latices.

In concluding his talk, Dr. Noble emphasized the importance and necessity for continued research to expand the uses of latex. Only through such research, he stated, would the gains already achieved by latex be continued and expanded. He expressed doubt, however, that the price of natural latex would drop as low as 25c a pound this year and said that in his opinion the spread between natural dry rubber and latex would continue to be greater than it was in the prewar period.

An added feature of the meeting was the presentation of a report on the "History of the New York Rubber Group." Prepared for publication by M. E. Lerner (RUBBER AGE) and R. G. Seaman *(India Rubber World)* in the April issue of *Rubber Chemistry and Technology* at the request of the Division of Rubber Chemistry, A.C.S., the report was read at the meeting by Mr. Lerner. The April issue of the Division's journal will also include histories of the Akron, Boston and Los Angeles groups.

During the course of the meeting, Joe Waters (General Cable), chairman of the group, announced that the annual summer outing will be held on Saturday, June 26, at Doerr's Grove, in Short Hills, N. J., and the golf tournament on Tuesday, August 24, at the Winged Foot Golf Club, in Mamaroneck, N. Y.

Connecticut to Hear Northam

A. J. Northam, of the Rubber Chemicals Division of E. I. du Pont de Nemours & Co., will be the principal speaker at the next meeting of the Connecticut Rubber Group, which will be held on May 14. Mr. Northam will speak on "Color Matching Rubber."

LOW TEMPERATURE DISCUSSION FEATURES CALIFORNIA MEETING

Approximately 40 members and guests attended the February 26 meeting of the Northern California Rubber Group, at the Hotel Claremont, Berkeley, Cal. A round table discussion on compounding of rubber for service at low temperatures was the subject of the evening. Discussion was led by members of the Mare Island Rubber Laboratory.

It was emphasized at the meeting that the cold compression set of neoprene is greatly improved by the addiiton of sulfur. For example, tests conducted for 94 hours at 0° F. by A.S.T.M. Method B showed that the cold compression set of a neoprene stock without sulfur was 66%. The addition of 1 part sulfur to the same stock decreased the cold compression set to 38%.

The effect of low temperature on the sealing properties of a neoprene gasket stock without sulfur was described by reference to an actual test on a gasket. The gasket, which was ½ inch thick by 1⅛ inches wide in cross-section, was molded in the form of a ring with a mean diameter of 11¼ inches. The recipe for this stock was as follows:

GR-M-10	100.0
Stearic acid	1.0
Neophax A	5.0
XLC Magnesia	4.0
P-33 (FT)	30.0
Paraffin	2.0
Circo L.P. Oil	20.0
Zinc Oxide	5.0

This made a typical gasket stock of 40 Shore Durometer.

The molded gasket was placed in a gasket holder which was grooved to receive it. A cover with a rounded sealing edge ¼ inch thick by 11¼ inch mean diameter was placed on the gasket. Force was applied to the cover to force the sealing edge into the gasket to a depth of ⅛ inch. The cover and holder were bolted at this deflection and nitrogen was introduced into the cavity between the gasket holder and the cover.

The detection of leakage was facilitated by placing the assembly in water. The pressure was raised to 500 p.s.i. at 82° F. with no leakage of the assembly. The pressure was released and the assembly was placed in methanol at —35° F. After two weeks at this temperature the pressure was raised again. Leakage was obtained at 210 p.s.i. and repeat tests leveled out at 185 p.s.i.

An interesting phenomenon was encountered when the test was conducted at 20° F. After two weeks at this temperature the pressure at which leakage was obtained was 50 p.s.i. and repeat tests leveled out at less than 5 p.s.i. These results indicated the crystallization of a GR-M stock compounded without sulfur was more rapid at plus 20° F. than at minus 35° F.

The meeting was preceded by a dinner party. A door-prize in the form on an electric clock, which had been donated by E. I. du Pont de Nemours & Co., Inc., was won by John Liljegren of Pioneer Rubber Mills, San Francisco, Calif.

BOSTON RUBBER GROUP HEARS TALKS ON POLYBLENDS AND PLASTICIZERS

Talks on "Processing and Physical Characteristics of Geon Polyblends," by George E. Field, technical staff representative of the B. F. Goodrich Chemical Co., Cleveland, and "Plasticizers for Rubber and Polyvinyl Chlorides," by Dr. R. J. Myers, head of the applications laboratory of the Resinous Products and Chemicals Co., Philadelphia, featured the Spring Meeting of the Boston Rubber Group. The meeting was held on March 19 at the Somerset Hotel in Boston and attracted some 330 members and guests.

Past Chairmen in Attendance

In opening the meeting, Richard K. Patrick (Vulplex), chairman of the group, announced that the first meeting of the group was held on May 9, 1928, and that the current meeting marked the group's twentieth anniversary. A number of past chairmen were present at the speaker's table and were introduced. These included: George H. Rockwell (1931), Warren E. Glancy (1932), John T. Blake (1936), R. J. Noble (1937), George W. Smith (1938), Emil H. Krisman (1939), Harold S. Liddick (1941), Donald D. Wright (1942), Laurence R. Clarke (1943), Harry A. Atwater (1945), James R. Geenty (1946), and Charles E. Reynolds (1947).

Other past chairmen, who were unable to be present at the meeting, included: John M. Bierer (1928-30), Bradley Dewey (1933-34), John J. Sindler (1935), James C. Walton (1940), and Joseph L. Haas (1944). All of the group's past chairmen are still alive with the exception of Charles R. Boggs who served as temporary chairman when the group was first organized in 1928. Mr. Boggs died in 1940.

Howard I. Cramer (Sharples Chemicals), vice-chairman of the A.C.S. Rubber Division, was then introduced and delivered a brief address. Dr. Cramer stated that there were now 12 local rubber groups, including the recently-organized Washington Rubber Group. He indicated that the forthcoming spring meeting of the Division at Chicago will feature the largest number of technical papers yet delivered at one of these meetings. He also referred briefly to the regional meeting which will be held in Los Angeles on July 21 and 22, and to the fall meeting which will be held in Detroit. In concluding, Dr. Cramer said that histories of all of the local rubber groups are being prepared and will be published in *Rubber Chemistry and Technology*, starting with the April issue.

Harold P. Fuller, permanent historian of the group, then delivered a short talk on the history of the Boston group. He first told of the New England Rubber Club, which was organized in 1899, the name of which was changed to the Rubber Club of America in 1913, and which is now known as the Rubber Manufacturers Association. He then gave some data on the formation of the Boston group in 1928 and touched on some of the highlights of various meetings over the past twenty years.

Field Discusses Polyblends

In his talk on Geon Polyblends, Mr. Field explained that the unique properties of Polyblend result from the colloidal blending of Hycar and Geon, the Hycar eliminating in most cases the need for a liquid plasticizer and also eliminating "nerve," frequently a troublesome factor in processing mill-mixed nitrile-vinyl blends. He stated that although the physical properties of Geon Polyblend and mill-mixed blends are comparable, there is no comparison between the two products with regard to processing properties.

Mr. Field pointed out, for example, that in the compounding of Polyblend and mill-mixed blends optimum physical properties are obtained in both cases by fluxing at a minimum of 300° F. However, 300° F. is the maximum temperature for the mill-mixed blends if more cross-linkage and, therefore, further degradation of processing properties is to be prevented. Polyblend, on the other hand, can be fluxed at 330° F. for 15 to 20 minutes with no appreciable effect on its extrusion or calendering properties.

The speaker showed a series of charts depicting various advantages offered by Geon, Polyblend, including non-volatile non-extractable, and non-migrating properties. The effect of additional plasticizer on physical properties was also portrayed by charts and slides. Some information on the new Geon Polyblend latex was also given by Mr. Field, who said that preliminary investigations indicated that this latex has average tensiles better than 4000 psi at 700% elongation when fluxed at 300° F.

Myers on PVC Plasticizers

Dr. Myers, the second speaker, discussed "Plasticizers for Rubber and Polyvinyl Chlorides," stressing some of the basic concepts in the selection of plasticizers for polyvinyl chloride. An abstract of this paper follows:

The formulation of a commercial polyvinyl chloride plastic is indeed an art but certain basic principles are of value in guiding the enterprising compounder in the selection of suitable plasticizers. Those qualities which may be termed "desirable" in a plasticizer for polyvinyl chloride are permanence (complete compatibility, non-volatility, non-migration, resistance to extraction by oil and water), stability (to heat and light), lack of odor, and qualities of variable importance such as low temperature flexibility, good electrical characteristics, light color, flame-resistance and non-toxicity.

An analysis of the factors which contribute to each of the desired qualities shows that high molecular weight derivatives are to be preferred inasmuch as the low vapor pressure and low rate of diffusion of such compounds contribute to non-volatility, non-migration into adjacent polymeric structures, low odor, and resistance to extraction. The ester and nitrile groups are preferred as solvating or compatibilizing groups in the plasticizer molecule in view of their efficiency of plasticization and general stability.

Low temperature flexibility and flame-resistance are achieved practically by blending of plasticizer or special compounding. Light color and electrical characteristics are achieved primarily through manufacturing procedures designed to purify the plasticizer. Some progress has been made in the development of a new test method for the numerical rating of the flame-resistance of different plasticizers.

It is not possible to analyze fully the ultimate performance of a polyvinyl chloride composition in terms of the basic character of the plasticizers used, but a consideration of the fundamental factors involved should be of great assistance in the design of superior goods.

Chicago Group Hears Markey

Approximately one hundred members and guests attended the March 26 meeting of the Chicago Rubber Group in the Morrison Hotel, Chicago, Ill. The speaker for the evening was Major Howard T. Markey, Commanding Officer of the 46th Air Reserve Fighter Squadron, who spoke on his experiences as a test pilot. Major Markey was one of the original test pilots assigned to the development of jet plants in 1943, and he is of the opinion that interplanetary travel will come about within our lifetime, especially since the sonic barrier has been crossed. Colored motion picture of jet planes in flight and a motion picture showing the assembly and flight of captured German V-2 rockets in New Mexico completed the novel program.

Southern Ohio Outing Set

Plans have been completed for the annual outing of the Southern Ohio Rubber Group. The outing will be held on Saturday, May 15, at Edelweiss Park, near the Englewood Dam in Dayton, Ohio. It will feature golf, baseball, horseshoes, volley ball, and other outdoor sports. Events will get underway shortly after noon. R. K. Ritzert (Dayton Rubber) is chairman of the outing.

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*Bull To Address Detroit Group

The next meeting of the Detroit Rubber and Plastics Group will be held on May 21 at the Detroit-Leland Hotel in Detroit, Mich. Dr. A. W. Bull, of the U. S. Rubber Co., will deliver an address on "Problems in Tire Development." The Summer Outing of the group will be held at the Forest Lake Country Club, Detroit, on June 25.

Detroit Meeting Now Definite

It has been definitely decided that the Rubber Division, A.C.S., will not meet with the parent society this Fall, but will hold its own meeting in Detroit, Michigan, November 8, 9 and 10, at the Book Cadillac Hotel. The Detroit Rubber and Plastics Group will be host to the Division for this meeting.

An Index to Volume 62 of RUBBER AGE will be found on Pages 124 to 127 of this issue.

DETROIT GROUP WINTER MEETING FEATURES ADDRESS BY McCOLM

The Winter Meeting of the Detroit Rubber & Plastics Group, Inc., was held at the Detroit-Leland Hotel, Detroit, Mich., on February 20, with approximately 150 members and guests in attendance. Principal speaker of the evening was Dr. E. M. McColm, Technical Director of Plantations of the U. S. Rubber Co. Dr. McColm spoke on "The Political and Economic Developments in Rubber Producing Areas of the Far East."

Dr. McColm summarized the original trend of population development that created South East Asia as the present important rubber producing area of the world. The speaker went on to relate that present rubber production in South East Asia is greatly influenced by political factors. While the insistence of a democratic Federated entity is a primary demand, he stated, local authority freely admits the need of Western assistance technically and financially.

The speaker pointed out that power and survival of the inhabitants of South East Asia is largely based on rice production. Sustenance of life transcends cultural or political aspirations, he said. Western influence and domination have stalemated the original cultural tendencies, and, singularly, there has been no marked disposition to develop western culture in replacement.

Dr. McColm stated that the natural rubber industry seems to be oblivious to the thought of synthetic rubber competition on the marke. Such a contingency is definitely a possibility, he pointed out. Natural rubber producers must make an effort to regain the markets they lost during the war.

At a business meeting preceding Dr. McColm's address, the new group of officers and the Executive Committee for 1948 were introduced to the member body. The Chairman of the group introduced Harry E. Outcault, Chairman of the Rubber Division, A.C.S., who outlined plans for the Detroit Divisional Meeting. It was emphasized that the success of that meeting will depend on the wholehearted cooperation of the Detroit Group.

Gurnham Offers Consulting Service

C. Fred Gurnham, chemical engineer of 72 Lake Street, Hamden 14, Conn., has recently entered the independent consulting field. Mr. Gurnham has worked in the chemicals, electroplating, rubber, plastics, textiles and paper fields for the past sixteen years. During the past four years he was associated with the Whitney Blake Co., New Haven, Conn., where he designed, built and operated a continuous, multiple-wire-electroplating plant, used to brass-plate electrical conductors for adhesion of the rubber insulation. Mr. Gurnham also built a plastic compounding department for the company. Holder of degrees from Yale and New York Universities, he is a member of the American Chemical Society, the American Electroplaters' Society, the Connecticut Rubber Group and various other professional and technical groups.

Dinsmore Awarded Colwyn Medal

Dr. R. P. Dinsmore

The Council of the Institution of the Rubber Industry has awarded the Colwyn Gold Medal for 1947 to Dr. R. P. Dinsmore, vice-president in charge of research of the Goodyear Tire & Rubber Co. The award was based on Dr. Dinsmore's work in the rubber industry coupled with the American rubber industry's contribution to the development of synthetic rubber during the war. Presentation of the medal will be made in London next June during the Second International Rubber Conference.

The Colwyn Medal, given by the late Lord Colwyn, is awarded for conspicuous services of a scientific or technical character, having an important bearing upon the rubber industry. Dr. Dinsmore is the 16th Colwyn medalist, and the first American upon whom the honor has been conferred.

Born in Tewksbury, Mass., Dr. Dinsmore was graduated in 1914 from M.I.T. and immediately joined Goodyear in its experimental department in Akron. He went to the Bowmanville plant in Canada in 1916 as a compounder, became assistant chief chemist at the New Toronto plant in 1917, chief chemist of the Los Angeles plant in 1919, returned to Akron in 1921 as assistant development manager, was named assistant to the factory manager in 1932, became development manager in 1939, and was elected a vice-president in June, 1943. He directed research on Pliofilm and on the first rayon cord tire. The Goodyear Research Laboratories are under his direction. During the war, Dr. Dinsmore served as assistant deputy rubber director for the government.

Dr. Dinsmore was given an honorary degree of Doctor of Engineering in 1940 by the Case Institute of Technology, Cleveland, Ohio. He is past president of the Akron Section of The American Chemical Society, the Rubber Division of the American Chemical Society, and the Akron Rubber Group. He is a Fellow of the Institution of the Rubber Industry, of the American Institute of Chemists and of the American Association for the Advancement of Science, as well as a member of other societies.

WASHINGTON RUBBER GROUP IS FORMED IN NATION'S CAPITAL

The Washington Rubber Group is the latest of the local rubber groups to be organized. Long under consideration by a group in Washington, D. C., many of them members of various government agencies concerned with rubber, an organizational meeting was held on February 25, at which the following officers were elected: *President,* T. A. Werkenthin (Bureau of Ships); *Vice-President,* R. J. Devereaux (Goodrich); *Secretary-Treasurer,* Norman Bekkedahl (Bureau of Standards) *Recording Secretary,* Ethel Levene (Bureau of Ships). Approximately 50 attended the organizational meeting.

The first formal meeting of the group was held on March 9, at the National Academy of Sciences Building, Washington, D. C., at which time, Everett G. Holt, rubber adviser to the U. S. Department of Commerce, gave a talk entitled, "Review of the World Rubber Situation." Following Mr. Holt's talk, there was shown, through the courtesy of the Firestone Tire & Rubber Co., the film, "Liberia, Africa's Only Republic."

The film was introduced by Charles D. B. King, present Liberian Minister to the United States, and past three-term President of the Republic of Liberia, who gave an excellent review of historical events leading to the formation of his republic and also of the splendid cooperation and relationships between his country and the United States. Approximately 180 members and guests attended this first meeting.

The new group welcomes members from any part of the country. The annual dues are $2.00, and checks should be made payable and sent to the secretary-treasurer, Mr. Bekkedahl, c/o National Bureau of Standards, Washington 25, D. C. Present plans are to hold evening meetings the second Tuesday of each month.

Changes at Bell Laboratories

Several organizational changes were recently made at the Murray Hill Laboratory of the Bell Telephone Laboratories, Inc., at Murray Hill, N. J. F. S. Malm is now in charge of wire and cable insulation and rubber products engineering. V. T. Wallder is handling plastics insulations; George N. Vacca, rubber insulations, and H. Peters, rubber products. Dr. A. R. Kemp is now acting as a consultant to the Chemical Products Section at the laboratory.

Commend Goodrich Labor Relations

The management-labor relations of the B. F. Goodrich Co. were described as "reasonably stable and conducted on a sound business-like basis" in a special report recently made by a congressional committee. The report was one of a series of case histories made by a Senate Committee headed by Sen. Joseph H. Ball. The report deals with management-labor relations at Goodrich during the past 20 years and also includes a short history of the United Rubber Workers of America.

CHICAGO RUBBER GROUP SPONSORS PANELS AT TECHNICAL CONFERENCE

Two panel discussions on the general theme "Engineering with Rubber," covering the presentation of four papers, were held at the Hotel Stevens in Chicago, Ill., on March 24. The panels were sponsored by the Chicago Rubber Group in connection with the annual Chicago Technical Conference and Production Show. Dr. H. A. Winkelmann, research director of the Dryden Rubber Division of Sheller Mfg. Co., presided as moderator at both panels.

The first panel, held in the early afternoon, featured papers on "Rubber Tires of the Future," by B. F. Benson, technical superintendent of the Inland Rubber Corp., and "Engineering with American Nitrile-Type Rubbers," by A. L. Brandt, general sales manager of the B. F. Goodrich Chemical Co. The two papers given at the second panel, held later in the afternoon, were "Engineering with Sponge Rubber," by Dr. C. S. Yoran, research director of the Brown Rubber Co., Inc., and "Engineering with Adhesives," by Fred Wehmer, Gordon Lindner and James Richards, of the Minnesota Mining & Manufacturing Co. The latter paper was presented by Mr. Wehmer.

Tires of the Future

Mr. Benson's talk was divided into four major topics: super cushion or extra low pressure tires; use of wire to replace cord in tires; the use of nylon, rayon and cotton, and development of low temperature polymers. He pointed out both the advantages and disadvantages of the super cushion tire, emphasizing the point that in order to take full advantage of this new tire it was necessary to use the wider base rim.

Mr. Benson mentioned some of the problems involved in the development program for use of wire in tires, pointing out that several wire tires have been used with good success on high speed buses and trucks and that a small number of such tires are currently being produced on a regular production basis. The differences between cotton, rayon and nylon were then discussed, along with the factors involved in designing a tire.

In concluding his talk, Mr. Benson presented a short review of the history of the development of synthetic rubber, including the recent development of the so-called low temperature synthetic. Some of the possible effects of this new rubber on the entire synthetic rubber program and the natural rubber picture were detailed by the speaker.

Brandt on Nitrile Rubbers

In discussing "Engineering with American Nitrile-Type Rubbers," Mr. Brandt first pointed out that much of the plant scale "know how" for the government synthetic rubber program came from the vast knowledge obtained from the experience gained by private industry, because some of the nitrile-type rubbers were in production before the war. He then outlined the numerous advantages of the latter type rubbers.

Mr. Brandt emphasized the fact that, properly compounded, the nitrile rubbers have superior resistance to mineral and vegetable oils, gasoline, waxes and many solvents, as well as superior properties for applications requiring elevated temperatures, extremely low temperatures, flexibility, abrasion resistance and low permanent set. He then cited a number of products made with nitrile rubber which take advantage of one or more of these factors, including a pipe line cleaner, a gasoline curb pump hose, valve inserts, packing gland rings, water pump seals, gasket rings, etc.

One of the outstanding properties of nitrile rubbers is their compatability with polyvinyl chloride and other materials. In this connection the speaker discussed some of the superior properties offered by mill-mixed blends of certain polyvinyl chloride resins and acrylonitrile-type rubbers, including the elimination of plasticizer migration, improved oil resistance, improved elongation, compression set and cold flow, and, finally, possible lower costs for end products. A few of such products were exhibited.

In concluding his talk, Mr. Brandt pointed out that the manufacturers of nitrile rubber do not make finished products, but do provide complete and competent technical services to the rubber and plastics industry. He urged that those concerned with the designing of products meticulously define their problem when seeking assistance, so that basic requirements are not lost in the shuffle.

Engineering with Sponge Rubber

The first of the late afternoon speakers was C. S. Yoran, who spoke on "Engineering With Sponge Rubber." Dr. Yoran first described the manner in which sponge rubber is manufactured. He then outlined the specifications for chemically blown sponge rubber, and the physical requirements of cellular rubbers.

Engineering applications of sponge rubber in the automotive industry was the next topic of Dr. Yoran's paper. Here, he said, the application of sponge rubber may be classified into three main types—weatherseals, pads and vibration dampeners. Sponge rubber was first used in automobile engineering some twenty years ago. Since that time, the uses of sponge have increased and complex molded strips are now being used by automotive engineers to perform many important functions.

Dr. Yoran stated that it was difficult to give any rules or formulas for engineering with sponge rubber. Illustrations may only serve to suggest methods of using sponge rubber for solving sealing or cushioning problems. It was suggested that engineers designing sponge rubber parts consult a sponge rubber manufacturer outlining their problem. In this way, parts can be designed which will be more economical to manufacture, give better service, and be more easily obtained from sponge manufacturers, he concluded. Dr. Yoran's talk was illustrated with lantern slides. (EDITOR'S NOTE: Dr. Yoran's paper will appear in an early issue of RUBBER AGE.)

The final paper of the two-panel program was that on "Engineering with Adhesives," delivered by Mr. Wehmer. He first outlined the general problems concerned in the manufacture and application of adhesives, citing several specific instances where properly selected and compounded adhesives met rigid requirements. A wider use of adhesives in industrial applications in the future was predicted by the speaker.

Wyrough Joins Carroll Concern

George J. Wyrough

George J. Wyrough, until recently in charge of Philblack Sales for the Phillips Petroleum Company in the Middle Atlantic States, with headquarters at Trenton, New Jersey, has become associated with R. E. Carroll, Inc., of Trenton, suppliers of fillers and chemicals to the rubber, paint, linoleum and plastic industries.

Mr. Wyrough has had long experience in the rubber industry in various capacities, and will devote a considerable portion of his time to the sale of Carroll products to the rubber industry. Mr. Wyrough was graduated in chemical engineering at Penn State College in 1920, and since that time has been successively associated with the following companies: as chief chemist of the Murray Rubber Company, Trenton, N. J.; in the development department of the Republic Rubber Company; as chief chemist of Thermoid Company, and as chief chemist and factory manager of Whitehead Bros. Rubber Company. He has also been Chairman of the New York Rubber Group and a member of the Heavy Mechanical Goods Technical Committee of the Rubber Manufacturers Association.

Rhode Island Plans Outing

The Rhode Island Rubber Group has announced that its Summer Outing will be held on June 24, at the Pawtucket Golf Club, Pawtucket, R. I. The Fall Meeting of the Group will be held on November 24, at the Crown Hotel, Providence, R. I.

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ADDITIONAL BUNA REPORTS MADE AVAILABLE BY O.T.S.

Two reports containing translations of three research studies made by the Germans on processes connected with the production of buna rubber are now available from the Office of Technical Services of the Department of Commerce, as follows:

Development of a New Styrene Catalyst (PB-80757, 13 pages, mimeographed, 50c): This report traces the development of a new styrene catalyst which increased the yield of the Farben buna plant by 8 to 10%. Research to improve the styrene catalyst began in 1940 at the Styrene Laboratory at Hoechst, Germany, the report states. Scarcity of the oxides used in the old styrene catalyst and plans to expand the buna plant prompted the research. By 1944, test results showed that the new catalyst, in addition to increasing yield, also reduced the residue in crude styrene to 1.5 to 2.0 percent, cut the volume of waste gas by one half, realized a saving of about 11 percent on benzene, ethylene, and other raw materials, eliminated difficult and time consuming changes of catalysts, and had several other advantages over the old catalyst. The report traces the development of the new catalyst and gives chemical compositions and tabular data showing the performance of various experimental catalysts over a period of time.

Synthesis of Acrylamides and the Copolymerization of Acrylamides and Butadiene (PB-80383, 14 pages, mimeographed, 50c): This report contains translations of two Farben research studies on the production of acrylamides and the copolymerization of butadiene with acrylamides. Technical descriptions of the processes are given and tables are included giving data on copolymers of butadiene with acrylamides of primary and secondary amines, percent acrylamide in copolymers of butadiene-acrylamide in relation to yield, and "K" values of unregulated and regulated butadiene copolymerization.

Orders for reports should be addressed to the Office of Technical Services, Department of Commerce, Washington 25, D. C., and should be accompanied by check or money order, payable to the Treasurer of the United States.

Coming Events Scheduled for 1948

Apr. 21-23. Rubber Division, A.C.S., Spring Meeting, Hotel Sherman, Chicago.
Apr. 29. Northern California Rubber Group.
May 4. Los Angeles Rubber Group, Mayfair Hotel, Los Angeles, Cal.
May 7. Buffalo Rubber and Ontario Rubber Groups. Joint Meeting. General Brock Hotel, Niagara Falls, Ontario, Canada.
May 7. Chicago Rubber Group.
May 13. Quebec Rubber Group, Ritz-Carlton Hotel, Montreal.
May 14. Connecticut Rubber Group.
May 15. Southern Ohio Rubber Group. Outing. Edelweiss Park, Dayton, Ohio.
May 21. Detroit Rubber & Plastics Group, Detroit-Leland Hotel, Detroit, Mich.
May 27. Northern California Rubber Group.
June 5. Southern Ohio Rubber Group, Outing.
June 8. Rubber Division, C.I.C., Windsor Hotel, Mount Royal Hotel, Montreal, Canada.
June 18. Boston Rubber Group. Outing. Woodland Golf Club, Newton, Mass.
June 18. Akron Rubber Group, Outing.
June 21-25. A.S.T.M., Annual Meeting, Book-Cadillac Hotel, Detroit.
June 23-25. Second Rubber Technology Conference, London, England. (Auspices of Institution of the Rubber Industry.)
June 24. R. I. Rubber Club. Outing. Pawtucket Golf Club, Pawtucket, R. I.
June 24. Northern California Rubber Group.
June 25. Detroit Rubber & Plastics Group, Outing, Forest Lake Country Club, Detroit, Mich.
June 26. New York Rubber Group. Outing. Doerr's Grove, Short Hills, N. J.
July 17. Chicago Rubber Group, Golf Outing, Acacia Country Club, Chicago, Ill.
July 22-23. Rubber Division, A.C.S., Regional Meeting, Hotel Mayfair, Los Angeles, Calif.
July 24-25. Los Angeles Rubber Group. Outing. Catalina Island, Calif.
Aug. 24. New York Rubber Group. Golf Tournament, Winged Foot Golf Club, Mamaroneck, N. Y.
Sept. 10. Detroit Rubber & Plastics Group, Detroit-Leland Hotel, Detroit, Mich. (Tentative).
Sept. 17. Southern Ohio Rubber Group. Dayton, Ohio. (Tentative).
Sept. 24. Boston Rubber Group, Somerset Hotel, Boston.
Sept. 30. Northern California Rubber Group.
Oct. 1. Detroit Rubber Group. (Tentative).
Oct. 5. Los Angeles Rubber Group, Mayfair Hotel, Los Angeles, Cal.
Oct. 15. New York Rubber Group, New York, N. Y.
Oct. 28. Northern California Rubber Group.
Nov. 8-10. Rubber Division, A.C.S., Fall Meeting, Book-Cadillac Hotel, Detroit, Mich.
Nov. 18. R. I. Rubber Club, Crown Hotel, Providence, R. I.
Nov. 18. Northern California Rubber Group.
Dec. 7. Los Angeles Rubber Group. Xmas Party.
Dec. 9. Southern Ohio Rubber Group, Xmas Party, Miami Valley Country Club, Dayton, Ohio.
Dec. 10. New York Rubber Group, Xmas Party, New York, N. Y.
Dec. 10. Detroit Rubber & Plastics Group, Xmas Party, Detroit-Leland Hotel, Detroit, Mich.
Dec. 17. Boston Rubber Group, Somerset Hotel, Boston.

Black Production Lower

Production and deliveries of channel and furnace types of carbon black in January were below the December rates, according to a report issued by the Bureau of Mines. Production of channel black was 58,096,000 pounds in January, 58,602,000 pounds in December, 1947. Production of furnace types was 56,470,000 pounds in January, against 57,040,000 in December. Shipments of channel type amounted to 57,136,000 pounds in January, 59,254,000 in December. Shipments of furnace type were 51,089,000 pounds in January, 53,578,000 in December. Producers' stocks were 7,916,000 pounds of channel type at the end of January and 70,829,000 of furnace, as compared with 6,956,000 pounds and 65,448,000 pounds, respectively, at the end of December.

Lazars Leave Acme Organization

Harry Lazar, vice-president and sales manager of the Acme Backing Corporation, and associated with that firm for 27 years, and his brother, Abe Lazar, who was assistant secretary of the company, have both left the Acme organization. The Lazars have purchased an interest in the Korex Coating Corporation and the York Backing Corporation, affiliated concerns in Brooklyn, N. Y., and will continue their activities in the backing and coating field.

Lumar Opens Sales Office

The Lumar Products Co., 14 Sixth St., Bridgeport 7, Conn., has announced the opening of a general sales office at 62 William St., New York City, under the supervision of Milton R. Adler. The company manufactures toy balloons and specialties.

Crystex Price Reduced

A substantial reduction in the price of Crystex Insoluble Sulphur has been announced by the Stauffer Chemical Co., the second price reduction made in the last five months. The new price ranges from 19½c a pound in carload lots to 23c a pound in lots of less than 500 pounds. All prices are f.o.b. Chauncey, N. Y. The reduction was made possible by recent improvements in the manufacturing process.

Pyrometer Instrument Co. Moves

The Pyrometer Instrument Co., formerly of 103 Lafayette St., New York City, is now located at Bergenfield, New Jersey. A new plant, laboratory and office have been constructed, and the move was completed as of March 15. The Pyrometer Instrument Co. manufactures Pyro optical, radiation, surface, immersion and indicating pyrometers.

TALES WORTH RETELLING

(No. 3 of a series)

THE REFLECTION

IT HAPPENED that a Dog had got a piece of meat and was carrying it home in his mouth. On his way he had to walk over a plank lying across a running brook.

Midway over, the Dog looked down into the brook and saw his own shadow reflected in the water beneath.

Thinking that he saw another dog with another piece of meat in its mouth, the Dog determined to have that piece also.

So he snapped at the shadow in the water. As the Dog's mouth opened hungrily, the piece of meat fell out, dropped into the water and was never seen again.

★ ★ ★

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MARTIN STARTS SHIPMENTS OF MARVINOL FROM ITS PAINESVILLE PLANT

First shipments of Marvinol VR-10 vinyl resin have been made by the Chemicals Division of the Glenn L. Martin Co. at Painesville, Ohio, according to a company announcement on March 23. Construction of the plant was started in the Fall of 1946. Cost of erecting and equipping the plant was set at approximately $6,000,000. Annual production of resins is expected to be 25,000,000 pounds.

Marvinol VR-10 is a thermoplastic resin, marketed as a raw material in the form of a fine white powder. It is produced by combining acetylene and hydrogen chloride aided by catalysts to form vinyl chloride monomer. The liquid monomer is converted to a pure white granular powder by polymerization.

Marvinol compounds can be spread or calendered into sheets, films and coatings from rigid plastic to elastic. According to the company, the introduction of Marvinol VR-10 for the first time marks the availability of a high molecular weight vinyl resin which, when properly compounded, can be extruded, calendered, made into rigids, or formulated into dispersions.

Chemical research at the Glenn L. Martin Company has been a continuing program which is almost as old as the company itself. The decision of Glenn L. Martin, president, for an intensification of plastics research came as a result of the need for better materials to be used in the planes Martin was producing over 10 years ago.

When the Glenn L. Martin Company began building the B-26 Marauder bomber for the Army it was decided that Martin-developed flexible fuel cells would be used to outfit the Marauders. At the time, a number of the larger rubber companies frowned on the idea of a bladder type fuel cell and were reluctant to manufacture them as they questioned their practicability.

Mr. Martin assembled a group of rubber chemists as the result of which the company manufactured 1000 of the cells in its own plant to equip the first 100 B-26s. Later, one of the prominent rubber companies was given a license under the Martin patents and began production of these cells equipping more than 5,000 B-26s during the war. The Martin company continued to maintain its rubber research group in an effort to maintain quality and further improve these Mareng cells.

Settling basins, tank farm and acetylene storage tank at the new Painesville plant.

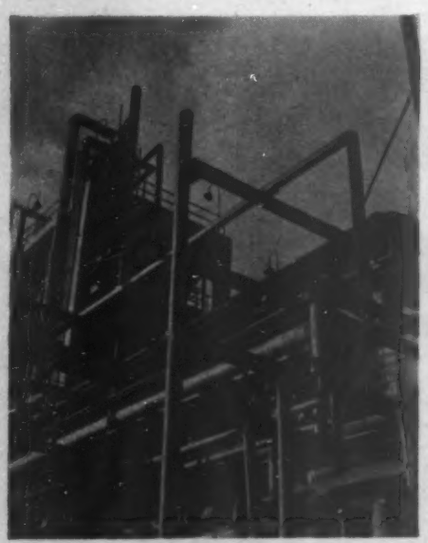
Shortages of vital materials during World War II brought an added impetus to the Martin research laboratories and before V-J Day, some 425 substitutes of plastic were made for scarce materials. It was out of this search for rubber substitutes and improvements in the construction of these Mareng cells that Marvinol was developed. This discovery proved so valuable that a special project was started which has grown into the present Chemicals Division.

In order to prove the Martin developed process and to obtain sufficient data for the design of a commercial plant, a pilot plant was erected at the Case Institute of Technology in Cleveland, Ohio, and a contract for industrial research was consummated with the school.

In June, 1946, the Martin Company disclosed that a chemical plant would be built at Painesville, Ohio. Decision to build the plant at the Painesville location was made because of the proximity of necessary raw materials. Careful study had been made of several sites in other parts of the United States where such materials were available but it was determined finally that they could be obtained most economically from sources in Painesville and Ashtabula, only 26 miles away.

Four months after the announced decision to build, possibilities for sales of Marvinol resin appeared so favorable that the Martin board of directors decided to more than double the production capacity of the projected plant. Although construction progress was drastically retarded by lack of building materials, and the difficulty in obtaining the necessary production machinery, by late Fall of 1947 shakedown runs on many of the units were in progress.

Robert H. Kittner, vice-president of the Martin organization, is in charge of the Chemicals Division. Assisting Mr. Kittner in directing the activites of the Chemicals Division are Clayton F. Ruebensaal, technical director; Harold M. Parsekian, director of sales and technical service; Dr. Karl Kammermeyer, manager of research and development; Henry S. Curtis, plant superintendent and Dr. William J. Lightfoot, chief engineer.



This myriad of pipes is typical of those carrying material through the plant processes.

Division Meeting Committees

Robert C. Dale, of the Inland Rubber Corporation, who is acting as general chairman of the Spring Meeting of the Rubber Division, A.C.S., to be held in Chicago on April 21-23 has announced the formulation of various committees, the memberships of which follow:

Banquet Arrangements: Francis S. Frost, Chairman (Frost Rubber), William Crumpler (Mepham), James Sheridan (N. J. Zinc), Frank Taylor (Commercial Solvents).

Meeting Room Arrangements: R. H. Gerster, Chairman (Inland Rubber), Sam Armatto (Witco Chem.), A. E. Forbes (Dryden Rubber), D. K. Huebner (Inland Rubber), C. E. Johnson (Inland Rubber), Al Loos (Mystik Tape), B. C. Oveson (Inland Rubber), H. F. Peters (Louis Melind), H. F. Schwarz (Sherwin-Williams), C. H. Skuza (Inland Rubber), M. B. Smith (Inland Rubber), Harold Stark (Dryden Rubber), Edwin Wagner (Witco Chem.).

Registration: F. W. Bickle, Chairman (Diamond Wire), Robert Campbell (N. J. Zinc), D. M. Pratt (Marbon), Ralph Anschutz (Witco Chem.).

Publicity: B. W. Hubbard, Chairman (Ideal Roller).

Information: A. G. Susie, Chairman (Marbon), J. L. Leeds (Frost Rubber), A. H. Krause (Marbon), H. F. Scott (Marbon), M. E. Jones (Marbon), R. Fulgrum (Socony Vacuum), C. R. Holt (Marbon), V. J. Labrecque (Victor Gasket).

Vendors Cocktail Party: Charles W. Baldwin, Chairman (United Carbon).

W. H. Peterson, of the Enjay Co., secretary-treasurer of the Chicago Rubber Group, has been designated as treasurer of the Division Meeting.

Acquires Rights to Ridacto

C. R. Johnson, sales manager of Ridbo Laboratories, Inc., for the past five years, has acquired from that company all rights to the accelerator activator "Ridacto." The acquisition includes assignment of patent application, inventory raw materials and finished product, manufacturing facilities, and laboratory equipment. The business will be carried on by Mr. Johnson under the name of the Spencer Products Co. at 111 Pennsylvania Ave., Paterson, N. J. The new company plans to offer new developments from time to time.

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RUBBER NOVELTIES IN EVIDENCE AT 1948 TOY FAIR IN NEW YORK

Rubber dolls, figures, balloons, playballs and numerous novelties were very much in evidence during the 1948 American Toy Fair held in New York City from March 8 to 20 under the sponsorship of the Toy Manufacturers Association. As usual, the major exhibits were stationed at the Hotel McAlpin, with additional exhibits at the Hotel Breslin, 200 Fifth Avenue, 1107 Broadway and other permanent showrooms. In general, exhibitors expressed satisfaction with sales recorded at the Fair.

Literally dozens of rubber and latex dolls, many of them stuffed with foam sponge rubber, were displayed. Among these were the "Midge" doll by the Imperial Crown Toy Corporation, the "Softee" by Horsman Dolls, Inc., "Baby Sue" by American Character Doll Co., "Sparkle Plenty," "Betsy Wetsy" and the "Magic Skin" dolls by Ideal Novelty & Toy Co., the "Eegee" dolls by the Goldberger Doll Corp., the "Roberta" doll, with natural rubber arms and legs, by the Roberta Doll Co., the "Velva" doll by Vogue Dolls, Inc., and the "Nasco" drinking and wetting dolls by Nasco Dolls, Inc. Not only do most of these latex skin dolls drink and wet, but an innovation is one that burps.

Natural rubber balloons, in all sizes, shapes and forms, featuring multi-color motifs, were displayed. Its entire "Blue Bird" line of colorfully packed balloons mounted to complement the full range of assorted colors was shown by National Latex Products Co. Toss-ups, squawkers and sets were displayed by Anderson Rubber Co. A complete new line, including round, airship and paddle balloons, as well as printed catheads, devilheads and rabbitheads, was exhibited by Resseger & Morgan Corp. Another relatively new line of extra heavy weight balloons for air or gas, including novelty toss-up balloons with inflatable ears, was displayed by the Ryan Rubber Co.

The Eagle Rubber Co. showed its line of popular balloons of all styles. The "Balloon Baton," a new type of balloon that stays up without gas, was displayed by the Van Dam Rubber Co. Of special interest was a new craft game consisting of specially treated balloons which can be inflated, twisted and molded into appealing shapes of various animals. Called "Romanimals," it is being produced by the Corey Games Division of the Quality Paper Box Co., of New York and Boston.

New Style Playballs Shown

Novelty was the keynote for the various types of playballs shown at the Fair. Eagle Rubber showed new tongue and face balls, in addition to its staple line of inflated balls. The fast-growing line of Darex marblized playballs, which feature individual tuck-in mouth inflation valves, was displayed by the Dewey and Almy Chemical Co. Gas-inflated and sponge balls, including autographed sponge baseballs, were exhibited by the Barr Rubber Products Co.

A completely new line of 6-inch high bouncer balls was displayed by Auburn Rubber Corp. A new type of soft ball, featuring a rubberized cord cover, was part of the Aviation Products Co. exhibit. A completely new line of sponge and sponge return balls was shown by the Fli-Back Co. The famous Weaver ball, as well as the Weaver-Wintark basketballs, footballs, soccer balls, etc., was displayed by the Weaver-Wintark Sales Co.

Infant toys and novelties were also featured at the Fair. A line of "Softies," including pigs and dogs which squeal when squeezed, and a line of soft sponge floating toys, were shown by Ideal Novelty & Toy Co. Jumbo-size "whistle" animals, all cellophane wrapped, were exhibited by the Eastern Rubber Specialties Co. An appealing line of latex cribcradle toys, including bunnies, cats, chicks, and ducks, all made with harmless, fast colors, was part of the Sun Rubber Co. exhibit. Bayshore Industries, Inc., which displayed its penny balloons, also introduced its new line of Jolly-Jingle-Joys, including turtles, ducks, birds and fish, each designed to fit the grasp of an infant's hand. Its popular blown rubber baby dolls and dipped latex animal toys were displayed by Seiberling Latex Products Co.

"Beauregard," the famous Elsie's calf, featured the Kaysam items by Molded Latex Products, Inc. The "Tilly Toy" line, consisting of some 15 latex characters, was part of the exhibit featured by the Tillotson Rubber Co. "Poochie," the wistful latex dog, was shown by National Playthings. Rubber tractors, cars, trucks, racers and various box sets were displayed by the Auburn Rubber Corp. A new item introduced at the Fair was the "Kiddy Drive," a rubber wheel with natural steering action mounted on a non-drooping wood stearing column. This was introduced by the Kiddy-Drive Co. of Philadelphia, Penna.

In addition to the maze of rubber items at the 1948 Fair, numerous inflatable vinyl toys were on display. Among these were new 15-inch and 19½-inch diameter play rings and playballs developed by the Transplastic Manufacturing Co. of New York.

NATURAL RUBBER SHOWED GAIN OVER SYNTHETIC USE IN 1947

The United States last year used more natural than synthetic rubber but the margin of difference was only 2,000 tons, according to revised figures recently released by the Department of Commerce. Of last year's consumption of 1,122,000 tons, natural rubber accounted for 562,000 tons and synthetic for 560,000 tons. The rest of the world used 598,000 tons of natural rubber and approximately 68,000 tons of synthetics.

The United Kingdom used 156,000 tons; France, 73,000; Canada, 61,000; China, more than 20,000; Latin America, about 45,000; Soviet Union, about 40,000 natural; Japan, approximately 13,000 tons. World consumption of natural and synthetic, not including Russian or Russian allied countries but including shipments from those countries, was estimated at not less than 1,720,000. "This is much higher than anyone predicted at the start of the year and is 70,000 tons greater than the estimate made last July by the rubber study group at Paris," according to Everett G. Holt, the Department's rubber advisor.

World Production Figures

World production of natural rubber, Mr. Holt reported, amounted to about 1,242,528 long tons last year, well above the previous year's 837,500 ton total. About half, 642,262 tons, was produced in British Malaya, while the Dutch East Indies produced an estimated 270,000 tons; Ceylon, 89,000 tons; British Borneo, 52,000; and some half-dozen others, the balance. United States stocks of natural rubber rose from 237,000 tons at the end of 1946 to 359,000 tons at last year-end.

Total imports of natural rubber ran below 50,000 tons a month in August through November, rose to 71,596 tons in December and to 80,852 tons in January. From February through April, they are not expected to average 50,000 tons. Stocks of natural rubber, including latex, available to industry, rose from 110,752 tons on November 30, 1947, to 129,038 a month later and 136,281 tons on January 31, 1948.

United States imports of rubber and allied materials and rubber manufactures last year were valued at $326,000,000, topped only in the stockpiling year of 1941 and in the 1925-27 period of high rubber prices.

Lower Quality Casings Revived

The post-war competitive battle among tire makers has swung into high gear with the introduction, by the major tire producing firms, of second and third-line tires into the market. Goodyear, Goodrich, Firestone and U. S. Rubber have already announced their lines of lower priced tires. Prices of these second and third-line tires will be substantially lower than the premium priced lines. Introduction of the lower-priced line was attributed to the fact that the large rubber companies have exhausted the market for higher priced casings. Smaller firms such as Seiberling and General are expected to fall into line. The new tires are priced at $12.40 and $13.95.

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NAMES IN THE NEWS

RICHARD PARSEKIAN, formerly associated with the research laboratories of the Flintkote Co., has joined the technical service department of the Warwick Chemical Division of Sun Chemical Corp., Long Island City, N. Y.

C. L. CAPPER, associated with the Goodyear Tire & Rubber Co. for the past 16 years, has sailed for England where he will be manager of the Pliofilm Division at the Wolverhampton plant.

DR. M. S. AGRUSS, a consultant in the field of petroleum chemistry and technology, and a research supervisor with the Pure Oil Co. for ten years, has been appointed director of the research and development department of the Precision Scientific Co., Chicago, Ill.

ARTHUR C. GRIMLEY, for many years associated with the shoe products division of the U. S. Rubber Co., has been named a vice-president of the Essex Rubber Co., Trenton, N. J.

KENNETH V. COOMBES, manager of purchasing for the General Chemical Division of the Allied Chemical and Dye Corp. since 1940, has left that company and has joined the Brown Co., Berlin, N. H., as general purchasing agent.

GEORGE A. WATT, long associated with the technical staff of the Hewitt Rubber Division of Hewitt-Robins, Inc., and more recently chief chemist of the National Synthetic Rubber Corp., has joined the Griffith Rubber Mills, Portland, Oregon, as technical director.

EARL T. STOLBERG, who joined the Goodyear Tire & Rubber Co. in 1941, and who has been a foreman in recent years, has been named production manager of the company's factory at Cali, Colombia, South America.

SHERMAN H. DALRYMPLE, formerly president of the United Rubber Workers of America and currently secretary-treasurer of the CIO's organizational drive in the southern states, was recently awarded the President's Certificate of Merit for his service toward the war effort.

HENRY A. ROME, associated with the U. S. Rubber Co. since 1915, most recently as a member of the molded goods department at the Passaic, N. J., plant, has been appointed manager of molded goods sales, succeeding F. W. ARCHIBALD, who is retiring after 40 years of service.

EMMETT B. REINHOLD, formerly chief chemist of the Pacific Tire & Rubber Co., has been appointed process engineer of the Pharis Tire & Rubber Co., Newark, Ohio.

H. F. GROENDYK, formerly manager of the Automotive, Agricultural and Aviation Department of the Manhattan Rubber Division, Raybestos-Manhattan, Inc., Passaic, N. J., has been appointed to the position of Director of Product Sales for the Division.

GERALD A. GREISS and HUGO L. SCHAEFFER, JR., both associated with the Dow Chemical Co. since 1940, have been appointed research director of the styrene polymerization laboratory and research director of the saran development laboratory, respectively.

HENRY P. HEAVISIDE, for many years general credit manager of the New Jersey Zinc Co., has been named assistant treasurer of the company.

ELIOT W. HOWARD, associated with the Firestone Tire & Rubber Co. for the past eight years, has been named sales manager in charge of industrial and trade division sales for the H. O. Canfield Co., Bridgeport, Conn.

DR. WARREN F. BUSSE, formerly director of physical research for General Aniline & Film Corp., has assumed the position of technical director of the Institute of Textile Technology, Charlottesville, Va.

PHILIP MITTON, formerly rubber technologist at the Portsmouth Naval Shipyard, Portsmouth, N. H., is now chief of the rubber and plastics section, materials branch, Engineer Research and Development Laboratories, at Fort Belvoir, Va.

DR. JOHN A. HUTCHESON, formerly associate director of the Research Laboratories of the Westinghouse Electric Co., has been appointed director, succeeding DR. L. WARRINGTON CHUBB, who is retiring for reasons of health.

H. W. FISHER, a director of the Esso Standard Oil Co. and president of the Enjay Co., Inc., a subsidiary, has been named general manager of East Coast refineries for the parent company.

FRED M. HALL, formerly chief chemist of Goodyear Rubber Sundries, Inc., and more recently associated with the Bishop Gutta-Percha Co., has joined the research staff of the National Lead Co. at Brooklyn, N. Y.

LEWIS F. JOLLY, controller of the Lake Shore Tire & Rubber Co., Des Moines, Iowa, since 1946, has been elected treasurer of that company. He will continue his duties as controller in addition to his new office.

Barnack Joins Binney & Smith

William Barnack, Jr.

Binney & Smith Co., New York City, has announced that William Barnack, Jr., has joined the company's technical service staff. Mr. Barnack was born in Cleveland, Ohio, and was connected with Socony Paint Products Division of Socony Vacuum Oil Co. for eight years. For one year he was a senior chemist with the Valspar Corp. Mr. Barnack is a member of the American Chemical Society and is continuing his university chemical education while training in the Binney & Smith laboratory.

A. W. REYNOLDS, associated with the Columbia Chemicals Division of the Pittsburgh Plate Glass Co. since 1931, has been appointed assistant to the executive sales manager of the Southern Alkali Corp. and the Columbia Chemical Division.

THEODORE S. CLOUSING, formerly associated with the Dicalite Co., has been appointed field representative for the Celatom Department of the Eagle-Picher Co., Cincinnati, Ohio, with headquarters in Chicago, Ill.

HERMAN C. KINSINGER, active in sales and engineering work in the Akron district for many years, has been named sales director of the Falls Engineering & Machine Co., Akron, Ohio.

BRIG. GENERAL DAVID N. HAUSEMAN, U. S. Army retired, has been elected president of Houdry Process Corp., Philadelphia, Penna., succeeding EUGENE J. HOUDRY, who has retired.

JOSEPH J. HART, formerly divisional sales manager of the Magicolor Co., Chicago, is now general sales manager of the Adhesive Products Corp., New York.

An Index to Volume 62 of RUBBER AGE will be found on Pages 124 to 127 of this issue.

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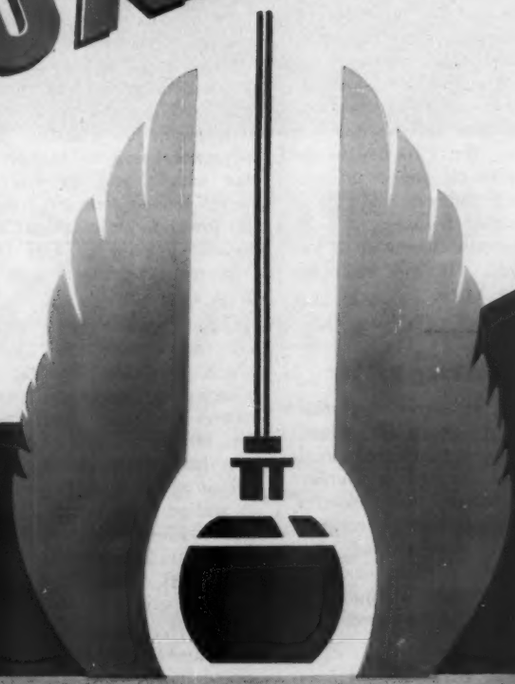

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Crossley Joins St. Joseph Lead

Robert H. Crossley

Robert H. Crossley, formerly vice-president and technical director of the Caldwell Co., has been appointed manager of technical service of the zinc oxide department of the St. Joseph Lead Co., 250 Park Ave., New York 17, N. Y. Mr. Crossley brings 14 years of experience to his new position. Following graduation from Ohio State University in 1934 with a chemical engineering degree, he joined the Firestone Tire & Rubber Co. in Akron as a tire and tube compounder. Transferring to Xylos Rubber Co. in 1936, he became assistant chief chemist of that company in 1942 and sales manager of Butaprene in 1944. He left the Firestone organization in 1945 to join the Caldwell organization, specializing in the sale of pigments and colors. Mr. Crossley is the author of several technical papers on synthetic and reclaimed rubbers. He is a member of the Rubber Division, A.C.S., and is currently program chairman of the Akron Rubber Group. He will make his headquarters in New York.

Rooney Heads Quabaug Rubber

Francis C. Rooney, formerly vice-president of the Quabaug Rubber Co., North Brookfield, Mass., has been elected president of the company, succeeding Herbert T. Mason, who continues as treasurer. Edward W. Varnum, formerly secretary and factory manager, was elected vice-president. The board of directors now consists of Messrs. Rooney, Varnum and Mason, and Percival P. Drury and William C. Baird, Jr.

Diamond Alkali Moves Offices

The Diamond Alkali Co. has moved its executive offices from Pittsburgh, Penna., to the Union Commerce Building in Cleveland, Ohio. Cleveland, company officials stated, is a more central location for the integrated control of the company. The move was an outgrowth of Diamond's expanded operations.

Introduce New Rubber Chemicals

The Chemicals Division of the Golden Bear Oil Co., Los Angeles 14, Calif., has completed and put into operation its first production units for various types of rubber chemicals and compounding ingredients. Five materials have been announced initially, with others to follow. The plasticizers produced by the company are identical in composition with the original Naftolens, sold by the Wilmington Chemical Corp. Golden Bear Oil has appointed the Harwick Standard Chemical Co. as its West Coast sales agency. The five new materials are as follows:

Califlux G.P., a general purpose plasticizer for natural and synthetic rubbers, similar to Naftolen MV, and compatible with the general purpose rubbers, natural rubber, and GR-S, in all proportions. It is a mixture of naphthenic hydrocarbons, predominantly unsaturated. It is 100% distillable, is reddish-brown in color, has a mixed aniline point below 40° C., a specific gravity of 1.00 to 1.03, and a viscosity of 5,000 to 20,000 cp at 25° C.

Califlux 510, a free-flowing plasticizer for general purpose rubbers, which is not recommended for use with the oil-resistant rubbers except in small amounts. Similar in composition to Califlux G.P. except for lower molecular weight and lower viscosity. It gives somewhat lower tensile and higher modulus than Califlux G.P., but its softening effect on the rubber mix is somewhat greater. Its specific gravity is 0.98 to 1.01, and its viscosity is 200 to 1500 cp at 25° C.

Califlux 550, an extender and plasticizer for natural and synthetic rubbers, especially recommended for compounds requiring high amounts of plasticizer and moderate filler loadings and for hard and semi-hard compounds. It is similar in composition to Califlux G.P., the main difference being its higher average molecular weight and its viscosity. It gives higher tensile strength, higher elongation, and lower modulus than Califlux G.P. Its specific gravity is 1.02 to 1.04, and its viscosity is greater than 100,000 cp at 25° C.

G.B. Light Process Oil, a processing aid for natural and synthetic rubbers which facilitates mixing and extrusion, reduces hardness and modulus, and increases elongation and plasticity. It does not influence curing characteristics and does not require additional sulfur or accelerator. It is light yellow in color, has an aniline point below 25° C., initial minimum boiling point of 300° C., a specific gravity of 0.95 to 0.97, and a viscosity of 40 to 100 cp at 25° C. It is soluble in most organic solvents.

G.B. Reclaiming Oil, a softening agent for natural rubber, synthetic rubber and mixed rubber scrap, which permanently softens the reclaim but does not evaporate or dry out. Identical with Wilcor III, it can also be used as a plasticizer for new rubber where a low viscous, free-flowing plasticizer in small amounts is required. It exhibits equal swelling action on natural rubber, GR-S and neoprene, greater swelling action on butyl rubber, and somewhat lower swelling on the acrylonitrile rubbers.

Walton Heads New Division

Dr. Charles W. Walton

The establishment of an entire new division to handle market research and marketing development has been announced by the Minnesota Mining & Manufacturing Co., St. Paul, Minn. Designated the New Products Division, it is headed by Dr. Charles W. Walton, assistant to the vice-president in charge of manufacturing. Assuming a kind of middle position between research and sales, the new division will take control of products which have been developed, but which have not yet been finally classified as to markets and sales groups. Prior to joining the company, Dr. Walton was manager of chemical products development for the Goodyear Tire & Rubber Co. He is a member of the American Chemical Society, the Commercial Chemical Development Association and the Chemical Marketing Research Association. Dr. W. E. Sohl, formerly of the company's central research department, has been named manager of marketing development, responsible to Dr. Walton.

"Big Four" Submits Sales Data

Complying with an order from the Federal Trade Commission, which had threatened civil penalties, the "Big Four" tire manufacturers—U. S. Rubber, Goodyear, Goodrich and Firestone—have sumhitted information concerning sales, prices and discounts to large-scale buyers of tires and tubes. Although the FTC survey covers all tire manufacturers, it had requested special data from the four larger concerns. Out-of-court efforts of the tire manufacturers against the FTC request were reported to have failed.

Recommend Guayule Appropriation

The House Appropriations Committee announced on March 17 that guayule rubber production in the United States could be increased 500 times in case of an emergency. The announcement was made in connection with the committee's recommendation that the full $349,000 requested by the Department of Agriculture for its natural rubber research efforts for the year beginning July 1 be granted.

CHANCE PLAYS NO PART IN BRIDGWATER *Accuracy*

THE inherent quality built in a tire is visible only in its outward appearance and is a function of the accuracy of the tire mold. That is why leading manufacturers specify "molds by Bridgwater."

Tire molds by Bridgwater are known for their precise, sharp corners and the accurate template fit of all characters and ribs in the tire design.

Much of this precision can be attributed to the special mold engraving machines developed and patented by us, and used exclusively in our Athens and Akron plants.

These unique machines make possible absolute mechanical and mathematical faithfulness in duplication of the original design — and at the lowest possible cost.

THE BRIDGWATER MACHINE COMPANY

Akron, Ohio

FOR BETTER MOLDS FOR BETTER TIRES *SPECIFY* BRIDGWATER

FINANCIAL NEWS

SEIBERLING 1947 INCOME SHOWS SUBSTANTIAL DROP

The Seiberling Rubber Co. has reported a net income for 1947 of $421,614, equal to 58c a common share, which compares with $1,124,141, or $3.00 a share, for the preceding year. The 1947 report consolidates the company's Canadian subsidiary for the first time. The drop in earnings was attributed principally to a second-quarter loss from the first strike in Seiberling's 26-year history. Net sales for the year dropped slightly, from $33,275,546 in 1946 to $32,116,490.

Total current assets of $11,291,717 compared with liabilities of $4,621,658 to show a ratio of 2.44 to 1. Working capital dropped $475,519, principally because of investments in plant and equipment, and amounted to $6,670,059 at year-end. Surplus was increased $29,576 for a year-end total of $4,710,754.

A statement accompanying the report indicated that borrowings from banks totaled $1,800,000, and that the company's major postwar expansion program had been completed with total new plant additions of $863,377 during the year. According to the statement, no further large additions are planned until costs drop to more reasonable levels.

Columbian Carbon Co.

For 1947: Net profit of $6,064,196, which is equal to $3.76 a share, and which compares with 5,307,861, or $3.29 a share, the previous year. Net sales for 1947 totalled $41,106,104, which compares with $34,363,005 reported in 1946. The consolidated balance sheet as of December 31, listed current assets of $16,780,924, and current liabilities of $4,832,083, which compares with $15,711,143 and $3,961,941, respectively at the end of 1946. Production of carbon black was the greatest in the company's history. It amounted to over 331.2 million pounds and sales kept step with production at a slightly higher level of 331.3 million pounds.

Raybestos-Manhattan, Inc.

For 1947: Net income of $2,335,755, equal to $3.72 a share, which compares with $1,651,187, or $2.63 a share, for the previous year. Net sales amounted to $58,308,929, as compared with $51,958,801 in 1946. The consolidated balance sheet at year-end indicated total current assets of $19,801,858, and total current liabilities of $5,475,238, as against $20,209,418 and $5,830,957, respectively, at the end of 1946.

I. B. Kleinert Rubber Co.

For 1947: Net profit of $424,258, equal to $2.65 each on 159,814 capital shares, which compares with $387,329, or $2.40 each on 161,563 shares reported for the previous year.

Thiokol Corporation

For 1947: Net profit of $96,780, compared with a net loss of $55,427 for 1946. Gross sales amounted to $1,204,598 for 1947, while sales for 1946 totaled $1,003,936. The balance sheet as of December 31, 1947, revealed total current assets of $760,264, including $408,881 in cash, $127,634 in notes and accounts receivable, $5,154 in claims for refund of Federal income and excess profits taxes, and $218,595 in inventories. Total current liabilities were $100,849, including $39,679 in accounts payable, $24,170 in accrued expenses, and $37,000 in accrued Federal income tax.

Pharis Tire & Rubber Co.

For 1947: Net profit of $358,874, which is equal to 85 cents each on 424,600 common shares of stock on total sales of $19,280,272. Because of the change from an October 31 fiscal year to a calendar-year basis, no comparison with the previous year is available. The consolidated balance sheet as of December 31, 1947, revealed total current assets of $5,299,482, and total current liabilities of $1,810,264. The report is a consolidation of activities of the company and its subsidiaries, including the Carlisle Tire & Rubber Co.

National Rubber Machinery Co.

For 1947: Net profit of $472,148, which is equal to $3.06 a share, and compares with $333,941, or $2.17 a share, for 1946 after $85,000 reserve for contingencies. A decided slump in orders for the first two months of 1948 of about 50% of the orders required to maintain last year's volume, may be a sign of "rough weather ahead," company officials stated. "Undoubtedly sales for the current year will be lower than in 1947," they said.

Cooper Tire & Rubber Co.

For 1947: Net profit of $145,976, which compares with $599,871 reported for the previous year. Sales were, respectively, $12,626,200 and $12,583,667. The drop in profits was attributed to increases in the cost of labor and other items entering into the production of tires and other rubber goods and to the price decline instigated last June.

Minnesota Mining & Mfg. Co.

For 1947: Net profit of $11,598,376, including a special income credit of $930,000, which is equal to $5.94 a common share and which compares with $9,921,944, or $5.08 a share, in 1946. Sales reached a new high during 1947 of $93,437,137, an increase of 24% over the previous year's volume of $75,169,623.

Intercontinental Rubber Co.

For 1947: Net loss of $354,063, which compares with net profit of $135,629 for the previous year. The 1947 report was based on sales of $1,357,033, as against $2,433,093 in 1946. The 1947 loss was attributed to an inadequate supply of guayule shrub and the severe drop in price of guayule rubber in the latter part of the year. The company produced 4,866,000 pounds of guayule in 1947 as compared with 8,587,200 pounds the previous year. The Torreon and Catorce factories were closed down last June and the Cedros plant in August. The latter plant resumed operations early in 1948, but the other two plants will probably remain closed throughout the current year. The consolidated balance sheet as of December 31, 1947, showed current assets of $1,268,409 against current liabilities of $48,338.

American Hard Rubber Co.

For 1947: Net profit of $623,232, which is equal to $5.75 a common share, and which compares with $207,686, or 82 cents a share, for 1946. Net sales of $17,695,471 in 1947 compared with $13,624,977 in 1946. Figures included earnings of a subsidiary company.

United Carbon Co.

For 1947: Net profit of $3,159,138, which is equal to $3.97 each on 795,770 common shares, and which compares with $3,010,284, or $3.78 a share, for 1946. Net sales of $23,915,596 in 1947 compares with $22,312,818 reported for the previous year.

Mansfield Tire & Rubber Co.

For 1947: Net profit of $1,965,483, which is equal to $12.13 a common share, and which compares with $1,960,584, or $12.80 a share, the year before. Net sales of $40,499,826 for 1947, compare with $35,286,340 in 1946.

Thermoid Company

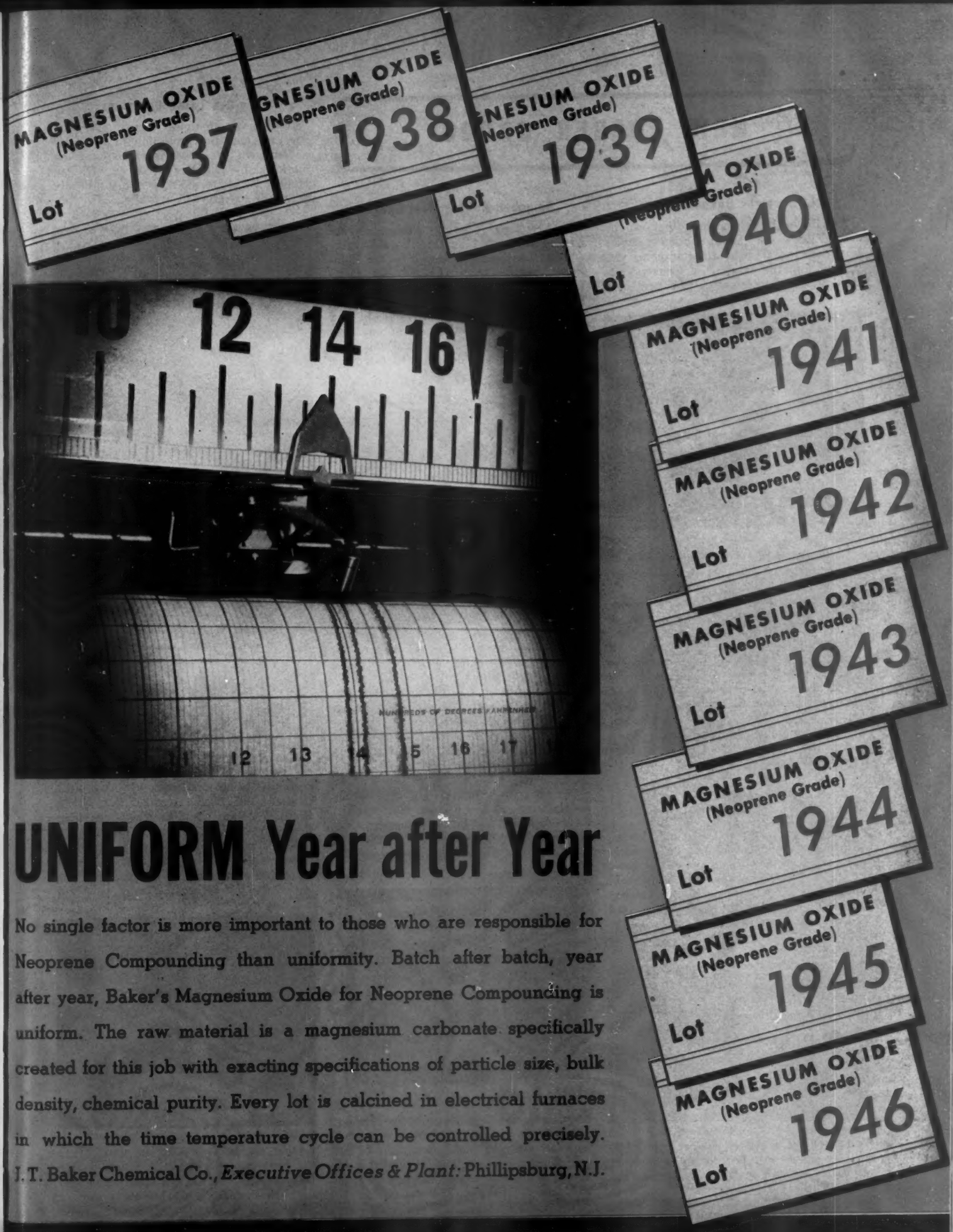
For 1947: Net income of $963,468, which is equal to $1.21 a common share, and which compares with $853,197, or $1.19 a share, for 1946. Totals include earnings of subsidiary companies.

American Wringer Company

For 1947: Net profit of $949,504, which is equal to $3.43 per share. The income reported for the previous year was equal to $2.17 a share.

Mathieson Alkali Changes Name

Stockholders of the Mathieson Alkali Works have approved a change in the company's name to the Mathieson Chemical Corp. The change from the original name, adopted when the company was formed in 1892, was made for the purpose of identifying the company with its increasingly diversified line of products. The new name will become effective as soon as registration formalities have been completed.



UNIFORM Year after Year

No single factor is more important to those who are responsible for Neoprene Compounding than uniformity. Batch after batch, year after year, Baker's Magnesium Oxide for Neoprene Compounding is uniform. The raw material is a magnesium carbonate specifically created for this job with exacting specifications of particle size, bulk density, chemical purity. Every lot is calcined in electrical furnaces in which the time temperature cycle can be controlled precisely.

J. T. Baker Chemical Co., *Executive Offices & Plant:* Phillipsburg, N.J.

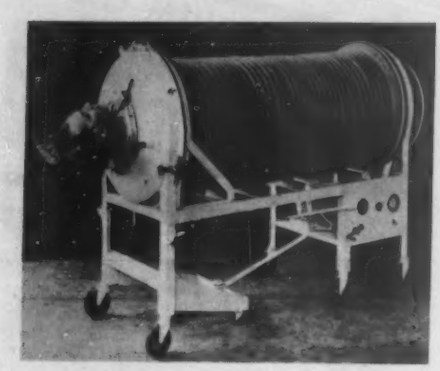
Baker's Chemicals

C. P. ANALYZED • FINE • INDUSTRIAL

NEW RUBBER GOODS

Lightweight Rubber Lung

A lightweight rubber lung that can be carried like a stretcher is the latest device for rendering artificial respiration to victims of infantile paralysis, drowning, electric shock and poisoning. The new lung



is built around a large rubber bellows which replaces a heavy steel tank used to enclose patients in iron lungs. An electric pump forces air in and out, simulating breathing. The bellows, developed by United States Rubber Company and the Iron Lung Company of America, is made by a new process used during the war to produce flexible non-metallic tubing for airplanes. An important advantage of the new respirator is that it can be transported easily to the scene of an accident by truck, ambulance or airplane. When not in use it can be folded up for storage in a small space.

Motor Car Coin Holder

The Trydea Motor Car Coin-Holder, designed to enable motorists to quickly locate coins when driving up to toll gates or parking meters, is currently being marketed by Trydea, Inc., 30 Rockefeller Plaza, New York 20, N. Y. The coin holding unit consists of a metal semi-cylinder with a compressed spring. This

is backed by a rubber suction cup. The unit is simply attached to the windshield or dashboard of any car by moistening the edge of the suction cup and pressing it onto the place desired. Nickels, pennies, dimes and quarters are slid into the coils of the spring, ready for instant removal.

Rainchek Rubber Heel Guards

A new item offering women a sure way to stop splashing their hose in rainy weather has been introduced by the Rainchek Manufacturing Co., 10 No. Delaware St., Indianapolis, Ind. Called the Rainchek Heel Guard, the item is a patented rubber device which quickly and easily slips on over the heel of any shoe and stops unsightly hose splashing. The guards, which are designed to catch the

water off the heel and direct it back down to the ground, are furnished in an attractive, moisture-proof bag that easily slips into the purse when not in use. It is made in several sizes to insure perfect fit on any shoe. A non-skid design is utilized.

Vanguard Jingle Ball

An attractive "Jingle Ball," 7½ inches in diameter, made of clear vinyl plastic, has been introduced by the Vanguard Corporation, 29 Worthington St., Springfield 3, Mass. The Jingle Ball has two small

bells sealed inside, giving a baby-pleasing tinkle when shaken. The ball is decorated with an alphabet block design in bright red, non-toxic color, and is washable. A new type of non-scratch valve makes the ball easily inflatable and deflatable. All seams are electronically sealed. The company is also featuring a number of other vinyl toys, including a life-like Scotty.

Dry-Ees Latex Coverings

A line of air-tight, water-tight latex coverings for the protection of wet, dry or ointment dressings, is currently being marketed by Dry-Ees Products, 147 Van Houten St., Paterson 1, N. J. Especially designed to prevent irritation of open

wounds, skin diseases, ulcers, etc., where water or other chemical agents retard healing, the Dry-Ees Latex Coverings permit patients to bathe without the annoyance of water-soaked medical dressings. Both ankle and sandal models are available for such purpose. A special knee model has also been developed for the Quartermaster Corps, for use in cold and wet climates. This latter model is also recommended for hunters and sportsmen, since it aids in the prevention of chilblains, trench foot, frostbite, etc. The knee model is illustrated herewith.

Merry-Babe Toy

A new practical novelty for babies under the name of the Merry-Babe Toy is currently being marketed by Associated Crafters, 8517 Nineteenth St., N.W., Seattle 7, Wash. A firm, durable teething rubber, rose pink in color, dangles by a bead chain from a rust-proof steel coil spring, with jingle bells attached to the bottom of the teething unit and at the top of the coil spring. A large, powerful

suction cup holds the toy in place where the baby can play with it, either on the baby stroller, or in the crib, or on the high chair. The lively spring action of the toy, combined with the tinkling bells and cheerful colors, is said to keep infants contented for hours.

FOR A BETTER BLOWN SPONGE . . .

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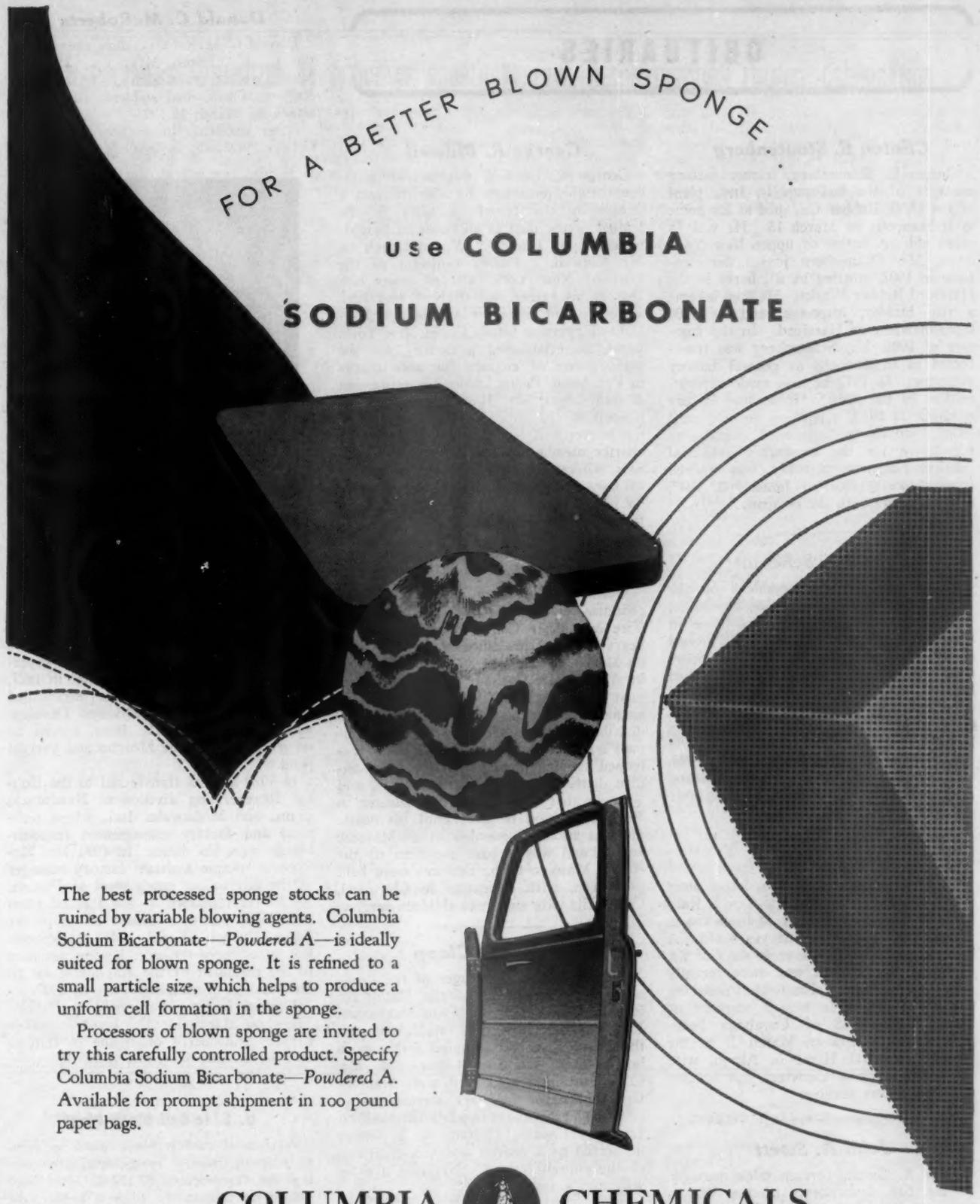
SODIUM BICARBONATE



The best processed sponge stocks can be ruined by variable blowing agents. Columbia Sodium Bicarbonate—*Powdered A*—is ideally suited for blown sponge. It is refined to a small particle size, which helps to produce a uniform cell formation in the sponge.

Processors of blown sponge are invited to try this carefully controlled product. Specify Columbia Sodium Bicarbonate—*Powdered A*. Available for prompt shipment in 100 pound paper bags.

COLUMBIA CHEMICALS

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PITTSBURGH PLATE GLASS COMPANY

OBITUARIES

Clinton E. Stoutenberg

Clinton E. Stoutenberg, former factory manager of the Indianapolis, Ind., plant of the U. S. Rubber Co., died at his home in Indianapolis on March 13. He was 74 years old. A native of upper New York State, Mr. Stoutenberg joined the company in 1902, starting as a laborer in the Hartford Rubber Works. He then became a tire builder, inspector, and in 1906 superintendent at Hartford. In the summer of 1906, Mr. Stoutenberg was transferred to Indianapolis as general factory inspector. In 1912 he was made superintendent of the plant. He became factory manager in 1919, a position he held until 1938, when he was appointed special representative for the company's industrial relations department. He was retired from active service on January 1, 1947, after 45 years with the company.

Frank G. Schenuit

Frank G. Schenuit, president of the Frank G. Schenuit Rubber Co., Baltimore, Md., died on March 30 at his home in Baltimore after an illness of several months. He was 53 years old. Mr. Schenuit founded his company in 1912, when he was nineteen years old, after he had experimented with making tires for motorcycle racing. He was also interested in flying and in 1919 obtained one of the first pilot licenses issued in Baltimore. In 1920, he established the present manufacturing plant. His widow and three daughters survive.

George Hewitt

George Hewitt, one-time assistant plant superintendent of the General Tire & Rubber Co., died on March 24, at his home in Akron, Ohio. He was 62 years old. A General executive in the early days of the company, Mr. Hewitt was more recently employed with the Saalfield Publishing Co. in Akron. He was a member of Moose Lodge 918 of Cuyahoga Falls. Services were held on March 27 at the Hummel Funeral Home in Akron, with interment in Stow Cemetery. A brother and two sisters survive.

John A. Swett

John A. Swett, former sales manager of the tire departments of the W. R. Grace Rubber Co. and the United States Rubber Co., died in St. Vincent's Hospital, West New Brighton, Staten Island, N. Y., on March 16, after a brief illness. He was 60 years old. Born in Brooklyn, Mr. Swett was educated on Staten Island, and had made his home there since 1894. He was one of the oldest members of the Clifton Boat Club and a Mason. His wife survives.

George R. Bidwell

George R. Bidwell, a principal developer of the pneumatic bicycle tire, and a pioneer in the bicycle industry in the United States, died at his home in Brightwaters, Long Island, N. Y., on March 16. Mr. Bidwell, a former Collector of the Port of New York, was 89 years old. During his career, Mr. Bidwell had been secretary and treasurer of the Spalding-Bidwell Sporting Goods Co. in New York. Later, he established a factory for the manufacture of engines for auto trucks in Pottstown, Penna. Since his retirement 20 years ago, Mr. Bidwell had devoted himself to the support of all projects in the interests of bicycle riders. He was a charter member of the American Wheelmen, where he worked for the enactment of laws giving bicyclists the same rights on public highways as other vehicles enjoyed. A son survives.

Herman W. Graham

Herman W. Graham, manager of merchandise distribution for the Goodyear Tire & Rubber Co., died suddenly of a heart attack at his office in Akron, Ohio, on March 11. He was 56 years old. Born in Akron, Mr. Graham started at Goodyear as a clerk in 1910. He was later engaged in various capacities relative to distribution of merchandise for the company's domestic plants. Mr. Graham was named assistant manager of the merchandise distribution department in 1919, and was elevated to the post of manager in 1925, a position he held until his death. He was an active member of all Masonic bodies, and was a past president of the Akron Masonic Club. Services were held in Akron, with cremation in Cleveland, Ohio. His wife and three children survive.

Walter C. Clapp

Walter C. Clapp, manager of the Product Sales Department of the Manhattan Rubber Division of Raybestos-Manhattan, Inc., Passaic, N. J., died on March 6, in the Passaic General Hospital following a heart attack. He was 48 years old. Mr. Clapp had been associated with Manhattan Rubber for 34 years, starting as an office boy. He was a member of the First Lutheran Church, Clifton, N. J., where he served as a deacon and vice-chairman of the church council. Surviving are his wife and a son.

The Slusser Trophy for the best 1947 safety record among world-wide plants of the Goodyear Tire & Rubber Co. has been awarded to the Torrance, Calif., synthetic rubber manufacturing plant. The plant achieved a perfect record, with 307 employees working a total of 534,000 man-hours during the year without a lost time accident.

Donald C. McRoberts

Donald C. McRoberts, chief chemist for the C. F. Church Mfg. Co., Holyoke, Mass., and former editor of the *India Rubber World*, died suddenly of a heart attack on March 12.

After majoring in sciences at Wabash College, Wabash, Indiana, Mr. McRoberts

entered the rubber field in 1912 as chief chemist for the G. & J. Tire Co., Indianapolis, Ind., a United States Rubber Co. subsidiary. He installed the company's first chemical and testing laboratory in 1913. In 1923 he became assistant superintendent. Transferred to Detroit in 1927, Mr. McRoberts and associates established and operated the Tire Division Development Department. He later served as superintendent of the Morgan and Wright plant.

In 1929 he was transferred to the Rubber Regenerating division at Naugatuck, Conn., and Mishawaka, Ind., where technical and factory management responsibilities were his duties. In 1931 Mr. McRoberts became assistant factory manager of the mechanical goods plant at Passaic, N. J. He remained at the Passaic plant until 1935, when he became editor of the *India Rubber World*. Mr. McRoberts left his editorial duties to become assistant to the president of the Kaysam Corp. of America, in New York City, in 1937.

Funeral services were held in Palmer, Mass., on March 14. The body was taken to Mr. McRobert's old home in Indiana for burial. He is survived by his wife, a daughter and a son.

U. S. to Sell Black Plant

A channel carbon black plant in Sunray, Moore County, Texas, originally costing the Government $2,177,000, has been placed on sale to the highest bidder, the War Assets Administration announced on March 9. Currently under interim lease by the Continental Carbon Co., the plant has an annual capacity of about 20,000,000 pounds of channel-type carbon black, is on a 150-acre site, with a five-acre housing site containing 20 frame dwellings for workmen. It has four burner units and other appurtenances. Sealed bids were to have been accepted until April 7.

NEW POLYMERS AUTHORIZED BY OFFICE OF RUBBER RESERVE, RECONSTRUCTION FINANCE CORPORATION

Listed below are types and properties of new experimental GR-S polymers (including GR-S latices) which have been authorized by the Office of Rubber Reserve, Reconstruction Finance Corporation, since publication of those in our previous issue. Procedures for the distribution and sale of these polymers will be found in our October, 1945, issue. Normally, experimental polymers will be produced only at the request of the consumers and 20 bales (one bale weighs approximately 75 pounds) of the original run will be set aside if possible for distribution to other interested companies for their evaluation. The 20 bales when available will be distributed in quantities of one or two bales upon request to the Sales Division of Rubber Reserve or will be held for six months after the experimental polymer was produced unless otherwise consigned before that time. Subsequent production runs will be made if sufficient requests are received to warrant them.

X Number	*Manufacturing Plant*	*Date of Authorization*	*Polymer Description*	*Special Characteristics*
X-439 GR-S	Firestone, Lake Charles	4/2/48	Standard GR-S made in Lake Charles plant equipment (pelletizer and one pass drier).	For April production.
X-440 GR-S		Canceled		
X-444 GR-S	Goodyear, Houston	3/11/48	Similar to Standard GR-S except for stabilization with 1.5 percent R-2019 G, a non-staining type antioxidant.	A non-staining and non-discoloring type GR-S being prepared for preliminary evaluation. Similar to X-385 GR-S. Scheduled for March production.
X-445 GR-S-AC	U. S. Rubber, Naugatuck	3/18/48	GR-S-SP latex coagulated after dilution with dilute aluminum sulfate solution and stabilized with 1.5 percent of UBUB.	This coagulation expected to result in very low mechanical water absorption properties. Scheduled for March production.
X-446 GR-S Latex	U. S. Rubber, Naugatuck	3/9/48	A GR-S latex having a 53-47 butadiene-styrene charge ratio, emulsified with potassium rosin soap and carried to high conversion and to approximately 48% solids.	An improved X-409 GR-S latex formulation being prepared for paper saturation, rug backing, etc. Scheduled for March production. Specification Limits—Total solids: 47.0 to 49.9%; Residual styrene: 0.10% maximum on total latex; pH: 9.5 to 11.5.
X-447 GR-S	General, Baytown	Authorization expected in near future	GR-S latex black masterbatch containing 50 parts Kosmos 60 per 100 parts 37 ± 4 Mooney GR-S.	
X-448 GR-S	U. S. Rubber, Borger	3/31/48	GR-S-40AC shortstopped with hydroquinone.	Scheduled for April production. The present shortstopper being used in GR-S-40AC is causing excessive corrosion in plant equipment.
X-449 GR-S	Firestone, Lake Charles	3/19/48	Lower viscosity (40 to 50 Mooney) GR-S-AC stabilized with 1.5% HAC, a non-staining type antioxidant.	A non-staining and non-discoloring type GR-S being prepared for preliminary evaluation and comparison with X-397 GR-S-AC. Scheduled for March production.
X-450 GR-S Latex	Firestone, Akron	3/31/48	Same as GR-S Type II Latex except that the Mooney viscosity of the contained polymer to be 32 to 42.	Scheduled for April production. Specification Limits—pH: 8.5 to 9.25; Total solids: 26 to 28%; Residual styrene: 0.50% maximum.
X-451 GR-S Latex	U. S. Rubber, Naugatuck	3/31/48	A 70 butadiene—30 styrene charge ratio latex with rosin soap emulsification.	High solids latex similar to Type VII (formerly X-370 GR-S latex). Scheduled for April production. Specification Limits—pH: 9 to 10.5; Total solids: 60.0 to 63.0%; Residual styrene: 0.10% maximum.

Note: The following experiment and numbered GR-S polymers and GR-S latices were produced during March, 1948: EXPERIMENT GR-S POLYMERS—X-181-SP, X-278-SP, X-385, X-392-SP, X-393-SP, X-396, X-407, X-413, X-415, X-416, X-419, X-420, X-421, X-422, X-427, X-430, X-433, X-434, X-435, X-442, X-443, X-444, and X-449. NUMBERED GR-S POLYMERS—GR-S, GR-S-AC, GR-S-SP, GR-S-10, GR-S-10-AC, GR-S-12-AC, GR-S-20, GR-S-20-AC, GR-S-21, GR-S-25, GR-S-40-AC, GR-S-45-AC, GR-S-50, GR-S-60, GR-S-60-SP, GR-S-65, GR-S-65-SP, GR-S-Black-1, and GR-S-Black-2. GR-S LATICES—GR-S Latex Types II, III, IV, V, VI, VII and VIII, X-367 GR-S Latex, X-381 GR-S Latex, and X-429 GR-S Latex.

Mold Lubricant No. 72

A new type of mold lubricant is currently being marketed by the firm of Stoner's Ink, Quarryville, Penna. Called Mold Lubricant No. 72, the new material was primarily developed for use with tire molds, but is also finding application in connection with all types of molds. According to the manufacturers, the new lubricant keeps molds clean, releases tires easily, produces black finish, has no obnoxious odors, makes rubber flow better, and is non-inflammable. In use, one gallon of Mold Lubricant No. 72 is diluted with 4 gallons of water to make 5 gallons of finished product.

"Safe-Aire" Low Pressure Tire

The Seiberling Rubber Co., Akron, Ohio, recently announced the development of a premium quality extra low pressure tire. Named "Safe-Aire," the Seiberling tire is said to embody features which make it the safest tire ever built. Principal innovations are the company's patented "heat vents" in the tire shoulder, which ventilate the tire tread area and dissipate excess flexing heat, and a new, improved tread design. The new tread embodies "claw grips," and is said to provide 10% more traction than the saw-tooth tread, and 23% more traction than the conventional rib-type treads.

January Rubber Consumption

Consumption of rubber by manufacturers increased 1.56% during January, according to the Rubber Manufacturers Association. The use of natural rubber increased to 58,065 long tons during January against 56,284 long tons in December. Synthetic rubber use declined slightly from December's 43,230 long tons to 43,002 for January. Total rubber consumed during January was 101,067 long tons against 99,514 long tons for December. In addition, the industry consumed 25,539 long tons of reclaimed rubber during the month against 25,229 long tons during the previous month.

LOS ANGELES NEWS

The April 6th meeting of the Los Angeles Rubber Group was preceded as usual by an informative lecture before the Technical Group Section. Dr. Fritz S. Rostler, Director of Research and Development, Golden Bear Oil Co., addressed the technical members on the subject of "Petroleum Products for Rubber."

Although petroleum products are used in considerable quantities by the rubber industry, very little information as to what these products are and how they are made is available to rubber compounders. Dr. Rostler's talk was a beginning towards filling this gap. His discussion embraced the underlying principles and major operations in the manufacture of petroleum products. Specifications, their background and significance, were discussed and an over-all picture presented of the origin, composition, manufacture, and inherent properties of petroleum products used in compounding rubber. To illustrate his lecture, Dr. Rostler showed slides demonstrating his tables and figures.

Indicative of the scope of petroleum products used in the rubber industry, Dr. Rostler touched on each of the following points: composition of petroleum; refining operations; classification of crude oils; petroleum as source for rubber compounding ingredients; distillates; raffinates; acid sludges; solvent extracts; mineral rubber; specifications for unsaturated hydrocarbon extenders, etc.

The technical meeting was followed by a dinner and program for the general membership of the rubber group. The after-dinner program was highlighted by a lecture on present day economic trends by Dr. Cecil L. Dunn, consulting economist and Chairman of the Department of Economics of Occidental College.

Andrew Matelik, consulting technologist, has joined the Kirkhill Rubber Company as chief chemist.

Frank L. Beiter, formerly associated with the Pacific Rubber Co., has been appointed plant superintendent of the Golden West Rubber Mills.

Herman D. Rue has joined the Franklin Rubber Co. in charge of compounding.

James M. Davis has been appointed purchasing agent of the Arrowhead Rubber Co.

Roy N. Phelan, who recently acquired the interest of George Steinbach in the Atlas Sponge Rubber Co., has announced the continuance of Walt Westman as production superintendent.

Forms Plastics Division

The American Cyanamid Co., New York City, has formed a plastics and resins division, and has appointed James L. Rodgers, Jr., its general manager. Mr. Rodgers was formerly general manager of the Plaskon division of the Libbey-Owens-Ford Glass Co. The new division has been formed by merging the former plastics division with the ion exchange products department and the protective coatings department. C. J. Romieux is manager of the plastics department in the new division, and W. T. MacAdam is manager of the ion exchange products department. The name of the protective coating department has been changed to the coating resins department, with W. F. Whitescarver as manager.

Technical Booklet on Latex

The Office of Rubber Reserve has prepared a special 12-page technical booklet describing the development, properties and recommended applications of GR-S Latex Types III and IV. These latices feature good film strength, small particle size, good stability, and medium solids content. They are non-discoloring and non-staining. Copies of the booklet can be secured without cost by writing the Technical Service Section, Research and Development Division, Office of Rubber Reserve, Reconstruction Finance Corp., Washington 25, D. C.

Monsanto Plant Opens Soon

The first unit of the rebuilt Texas City, Texas, plant of the Monsanto Chemical Co., will be in operation shortly, company officials stated on March 24. The company's plant was virtually destroyed on April 16, 1947, by a fire which started when a large quantity of ammonium nitrate exploded aboard a French ship berthed at a nearby public dock. Production of styrene is a major operation at the Texas City plant. The new plant will be somewhat smaller than the one destroyed, but it will embody several design improvements. About $27,500,000 worth of currently uncompleted projects should begin operations during the coming year.

Form New A.C.S. Section

Formation of a new section of the American Chemical Society, which will study the manifold problems associated with marketing chemical products, was announced recently by Professor H. F. Johnstone of the University of Illinois, chairman of the Division of Industrial and Engineering Chemistry, with which the new unit will be affiliated. William H. Harding, director of the technical service and development division of the American Cyanamid Co. Laboratories, Stamford, Conn., has been named chairman of the group, which will be known as the Section on Chemical Marketing.

To Offer Second-Line Tires

Production and sale of a second, lower-priced line of passenger car tires, a move reported under study by the "Big Four" for several weeks, will be started by the U. S. Rubber Co. shortly, it was disclosed on March 18. Introduction of the lower-priced tire is expected to be followed shortly by other major tire makers, according to trade sources. Second, and often third and fourth line tires ranked high in sales volume in the pre-war market. Return to the pre-war practice is interpreted as reflecting the fact that supply channels of new tires have now filled to the overflow point. Several manufacturers have cut back tire production from record 1947 levels. The price and quality of U. S. Rubber's new product was not disclosed. A spokesman noted, however, that the difference in price of the pre-war first and second line tires will be about 10%.

Adds New Chemical Section

The National Security Resources Board will have a chemicals, rubber and plastics unit in operation this summer. The size of this division, one of 20 mobilization planning staff divisions, has not yet been determined. At present it is staffed only by Arthur Wolf, wartime Navy strategic raw materials official and former Food and Drug Administration research chemist. Norman Shepherd, chemical director of the American Cyanamid Co., has been appointed consultant on chemicals, rubber and plastics to NSRB Chairman Arthur M. Hill. The chemicals division is expected to get at least two more staff members within the next few months. When the division gets a fuller complement and a division chairman is appointed, studies of a number of chemicals and rubber, with a view toward the nation's strategic needs, will be undertaken.

Establishes British Affiliate

The Hardesty Chemical Co., New York City, manufacturers of plasticizers used with synthetic rubbers and vinyl resins, has announced the formation of a British affiliate, the Geigy-Hardesty Co., Manchester, England. The new affiliate will produce sebacic acid and related compounds. Geigy already manufactures plasticizers in Manchester under the name of Geigy Co., Ltd. The new company was formed in order to effect a more rapid and economical production of sebacic acid, etc. Because of the present situation in England the plant and general manufacturing arrangements have been scheduled to take effect over a reasonable period of time. A substantial tonnage production, however, is promised for later this year.

Potter Joins Genseke Co.

Mark L. Potter has been appointed director of Sales of Genseke Brothers, Chicago, Ill., producers of processing aids for the rubber industry. A graduate of Purdue University, Mr. Potter was previously associated with the Dixie Cup Co. of Chicago for 18 years. He resigned that position in 1946 to become president of the Gordon Specialties Co., before joining Genseke.

REDUCE SHRINKAGE

MORE ACCURATE PREFORMING

HIGH STRUCTURE

sterling S O

SMOOTH OUT

SMOOTH APPEARANCE

A SUPER HIGH STRUCTURE FURNACE BLACK

Cabot's Sterling S O (Smooth-Out), a super high structure furnace black, cuts the shrinkage of extruded and calendered rubber goods to new lows. More accurate preforming of molded articles and the smooth appearance of open cured materials make this black of interest to all rubber goods manufacturers.

Cabot's new, versatile Sterling S O furnace black is adaptable to incorporation in tires, tubes, cable jackets and mechanical goods of all kinds. Write for technical data.

GODFREY L. CABOT, INC.

77 FRANKLIN STREET, BOSTON 10, MASS.

Available in carloads

Smooth Out
Smooth Out
Smooth Out

CANADIAN NEWS

Strike action in the rubber industry of Canada unless the companies make what the union, considers reasonable wage offers soon was recently predicted by Joe MacKenzie, Canadian director of the United Rubber Workers of America (CIO-CCL).

A strike vote, the first in the rubber industry's 1948 wage negotiations, found employees of Gutta Percha & Rubber Ltd., voting 5 to 1 in favor of strike action to enforce wage demands. This plant employs some 1,100 workers. The vote came several days after the union rejected a company offer of a general wage increase. Negotiations, which began in January, are still continuing.

Meanwhile, union membership at the Bowmanville plant of the Goodyear Tire and Rubber Co. has authorized its committee to call a special meeting to consider strike action.

The union's original wage demand was for an increase of 22 cents an hour, but this figure was later reduced in varying degree in certain plants, with the average demand pared down to 17 cents. A union spokesman said the best company offer was an increase of 6½ cents an hour.

If strikes are thought necessary, union strategy appears to be aimed at shutting down a few plants at a time, rather than calling of a national strike in the industry.

A net profit of $388,497, representing a 12% decline from that of the previous year, has been reported for 1947 by the Dunlop Tire & Rubber Goods Co., Ltd. Working capital at year-end was listed at $3,341,081, an increase from the $3,204,377 shown at the 1946 year-end. Accounts receivable were shown at approximately $1,000,000, while inventories were listed at $3,327,972. Inventories at the end of the previous year were listed at $2,011,281.

Sustained heavy demand during 1947 for Dunlop products, resulting in part from the curtailment of tire production for domestic use during the war, caused sales to continue the upward trend experienced during the past two years and to establish a new record volume which was 4% higher than in the preceding year.

"The trend of manufacturing costs continued upward throughout 1947 and the end of this trend does not yet appear in sight," stated James I. Simpson, president. This fact, together with the general reduction in tire prices which became effective throughout the tire industry during the latter part of 1947 served to reduce the dollar return to the shareholders below the amount earned in the preceding year, despite the greater investment in production facilities and the increased volume of sales.

"In such conditions profitable operations becomes more than ever dependent upon a sustained higher volume of sales coupled with increased efficiency in order that the company's products may be sold at prices which will not restrict consumer demand and at the same time yield a profit."

Regular dividends were paid on the 5% preference shares and, having regard to the cash requirements for higher inventories and new construction projects, no increase was made in the dividend of $1.25 per share which had been paid on the common shares for the previous three years.

The Seiberling Rubber Co. of Canada, Ltd., has reported a net profit of $166,050 for 1947, which is more than double the $80,803 reported for the previous year. Current assets at year-end amounted to $1,749,893, which compares with $1,399,056 at the end of 1946, and current liabilities to $673,851 against $385,660.

M. L. Brown, president, in presenting the company's annual report for 1947, noted that there were indication late in the year that the replacement segment of the Canadian tire business had returned to the buyer's market. In September there was a reduction in price of approximately 11 per cent which brought these prices below prewar prices for tires of corresponding quality. This price reduction was in spite of substantial increases in costs of labor, materials and services.

Seiberling's volume of business is largely in the replacement field with export volume slightly in excess of volume to original equipment accounts. In spite of existing conditions as to cost and recovery price, the company hopes to increase its volume of business in the original equipment and export markets.

The increasing postwar use of natural rubber over synthetic rubber was shown in the figures for consumption and production in January, 1948, recently issued by the Dominion Bureau of Statistics.

Stocks of natural rubber at the end of January totalled 5,739 long tons, compared with last year's corresponding total of 3,729 long tons, an increase of 54 long tons to 2,246 and synthetic from per cent. Reclaim stocks fell from 3,195 long tons to 2,246 and synthetic from 4,316 to 3,921.

Domestic production of synthetic rubber fell from 4,408 long tons in January last year to 3,648, while reclaim increased from 329 to 371. Domestic consumption of natural rubber rose to 3,458 tons from 2,153, and reclaim dropped from 1,533 long tons to 1,339.

Canada's plastics industry is being bludgeoned out of existence by the new 25% excise tax, according to a statement made by Harold Timmins in the Canadian House of Commons on March 29. The tax was imposed in the November 18 austerity program. Mr. Timmins said many firms would soon have to go out of business and asked whether it was necessary to tax a product which contained only 11% of material which had to be bought in the United States. Finance Minister D. C. Abott stated that he did not think the industry would be put out of business, but agreed that sales might be reduced by the tax, which was its primary aim.

Shareholders of the Dunlop Tire and Rubber Goods Co., Ltd., at their annual meeting held on March 11, approved the proposal, recently announced, to terminate the agreement between Dunlop and Canadian Industries, Ltd., under which the latter company has been providing certain managerial services. The agreement has been in effect since 1932. The minority stock in Canadian Dunlop formerly held by Canadian Industries, Ltd., was recently acquired by the Dunlop Rubber Co., Ltd., of England.

W. H. Miner, president of the Miner Rubber Co., Granby, Quebec, was recently re-elected president of the Rubber Association of Canada. C. C. Thackray, president of Dominion Rubber Co., is vice-president of the association; R. C. Berkinshaw, general manager of Canadian Goodyear, is treasurer, and G. B. Smith is manager and secretary.

Forms Canadian Sales Agency

Ralph M. Ferguson

Ralph M. Ferguson, for many years associated with the Dominion Rubber Co. and its Naugatuck Chemical Division, has established R. M. Ferguson & Co., 66-A Roslin Ave., Toronto, Canada. The new company will act as manufacturers' representatives for a number of prominent suppliers in the United States and England. It will handle antioxidants, pigments and fillers for the rubber industry; plasticizers and other ingredients for the plastics field; vegetable oils for the paint and varnish trade, and miscellaneous materials for a number of other industries. Mr. Ferguson has some twenty years of experience in calling on Canadian industry.

A Free-Flowing Powder . . . easy to measure

PEPTON* 22

PLASTICIZER

Here is the effective plasticizer in ideal form: a free-flowing powder that is easy to measure and handle.

WHAT IT WILL DO

1. Reduce breakdown time and save power.
2. Increase production capacity.
3. Produce softer Natural rubber or GR-S in a given milling time.
4. Produce soft GR-S with plasticities which show no appreciable change on standing.
5. Control GR-S gel build-up in hot processing.
6. Plasticize reclaimed rubber, mixtures of reclaimed rubber and Natural rubber or GR-S, and also mixtures of Natural rubber and GR-S.
7. Produce softer or more plastic Natural rubber or GR-S mixed stocks in direct mixing.
8. Reduce heat developed in processing and thereby lower the processing temperatures.
9. Improve processing qualities and reduce rejects.
10. Give good physical properties.

Excellent for Sponge Rubber

WHAT IT WILL NOT DO

1. It will not produce dermatitis or toxic effects.
2. It will not discolor white or light-colored stocks.
3. It will not bloom.
4. It will not affect aging adversely.

PEPTON 22 Plasticizer now can be supplied in unlimited quantities.

SALES REPRESENTATIVES AND WAREHOUSE STOCKS: Akron Chemical Company, Akron, Ohio • Ernest Jacoby & Company, Boston, Mass. • Herron & Meyer of Chicago, Chicago, Ill. • H. M. Royal, Inc., Los Angeles, Calif. • H. M. Royal, Inc., Trenton, N. J. • In Canada: St. Lawrence Chemical Company, Ltd., Montreal and Toronto

*Reg. U. S. Pat. Off.

Calco

RUBBER CHEMICALS DEPARTMENT

CALCO CHEMICAL DIVISION

AMERICAN CYANAMID COMPANY

BOUND BROOK, NEW JERSEY

DC MOLD RELEASE EMULSION NO. 35

pays dividends in molding rubber sole stock

PHOTO COURTESY BALDWIN RUBBER CO.

DC Mold Release Emulsion No. 35 applied to press plates, gives clean, easy release and freedom from surface defects in molding rubber sole stock.

The least you expect of a mold lubricant is that it will give you easy release of molded rubber parts and tires. The most you hope for in a mold lubricant is that it will give you easy release plus major reductions in scrap and in mold maintenance. DC Mold Release Emulsion No. 35 gives you all of these plus values. That's why almost all of the major rubber companies are using this Dow Corning Silicone release agent.

In the molding of rubber sole stock, for example, the Baldwin Rubber Company of Pontiac, Mich. uses DC Mold Release Emulsion No. 35 to get a maximum number of salable soles per sheet. Easy release is secured by such a light application of this silicone lubricant, that non-knits and fold-overs are practically eliminated.

And that means lower costs all along the line. Fewer defects cut the cost of scrap and increase the production rate per press. Effectiveness in very small quantities means that Emulsion No. 35 costs no more than ordinary mold lubricants per molding.

Simply dilute DC Emulsion No. 35 with 50 to 150 parts of water, depending upon the application and spray or wipe the mold as often as necessary to maintain easy release. There's no dust or unpleasantness involved in the use of Emulsion No. 35.

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Chicago: 228 N. LaSalle Street • Cleveland: Terminal Tower
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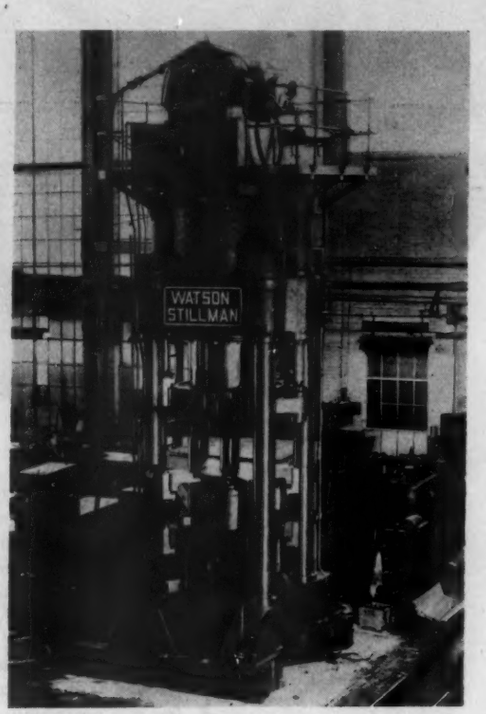
FOR MORE INFORMATION ABOUT DC MOLD RELEASE EMULSION NO. 35, PHONE OUR NEAREST BRANCH OFFICE OR WRITE FOR LEAFLET NO. V 5-E.

Dow Corning
FIRST IN SILICONES

NEW EQUIPMENT

Watson-Stillman Lead Covering Press

Of special interest to manufacturers of rubber and synthetic hose and covered cable is the new lead covering hydraulic press recently made available by the Watson-Stillman Co., of Roselle, N. J. The press is used to extrude a lead sheathing in the production of rubber hose or rubber and lead covered cable. Advantages



claimed for the new design features include: (1) Fingertip stepless control assures accurate setting which can be duplicated consistently, power consumption is proportional to volume setting; (2) Smooth, continuous pressure application eliminates any tendency toward plunger marks in the finished extrusion and further permits the use of pressures about half that required for water presses which reduces packing and joint maintenance; valves and pumps are packless and require no maintenance; (3) Safe operation and protection of press parts is afforded by interlocking press movements, which make it impossible to operate the press out of sequence, and a positive pressure unloading valve.

The new press is self-contained, featuring high-speed, moving down, four-column design, with direct-connected, motor-driven pumping unit mounted on top. It is arranged for push button, automatic, single cycle interlocking control, with a separate inching control for checking alignment. Construction details and materials used throughout result in a rugged piece of equipment that will stand up under severe operation conditions with a minimum of attention, according to the manufacturers. The presses are available in 650, 1350, 2100 and 3000-ton capacities. The 2100-ton model is illustrated herewith.

Special Purpose Synthetic Resins

DAREX* COPOLYMERS

High Styrene Rubber Resins

Darex Copolymers X34 and X43 are recommended for compounding natural and synthetic rubbers for applications where high hardness, stiffness, excellent abrasion resistance, superior tear resistance and good flexing—specially at low temperatures—are desirable.

These outstanding properties may be used to advantage in the manufacture of soles, heels and toplifts, light colored flooring, wire covering and molded mechanical goods.

We are interested in helping you solve any problems of special application. Competent engineers are available to work with you. For full information write Organic Chemicals Division, Dewey and Almy Chemical Company, Cambridge 40, Massachusetts.

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DEWEY AND ALMY CHEMICAL COMPANY

CAMBRIDGE 40, MASSACHUSETTS

Weathering qualities of RUBBER PRODUCTS determined with reliable accuracy in the

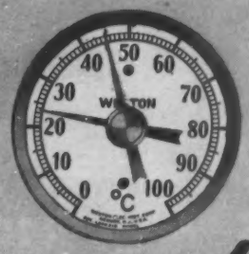
ATLAS *twin arc* WEATHER-OMETER

Any selected cycle of exposure to sunlight and wetting can be set for automatic continuous testing in the Weather-Ometer. Exact tests can be duplicated at any time by settings on the control panel which contains temperature regulator—time meter—light and water cycle switch — automatic cut-off switch — voltage adjusting switch — direct reading thermal regulator — reactance coil (for economical current consumption). The Weather-Ometer is fully automatic in operation; can be left unattended over night; only necessary to renew carbons once in 24 hours. Years of exposure to any conditions of weathering reduced to a few days testing in the laboratory with the Weather-Ometer.

Originators and sole manufacturers of accelerated testing machines for over a quarter of a century. Fade-Ometer, Weather-Ometer, Launder-Ometer — the accepted standard testing machines used all over the world.

ATLAS ELECTRIC DEVICES CO.

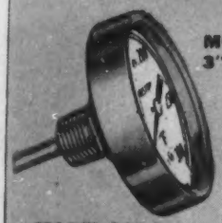
361 West Superior Street, Chicago 10, Illinois



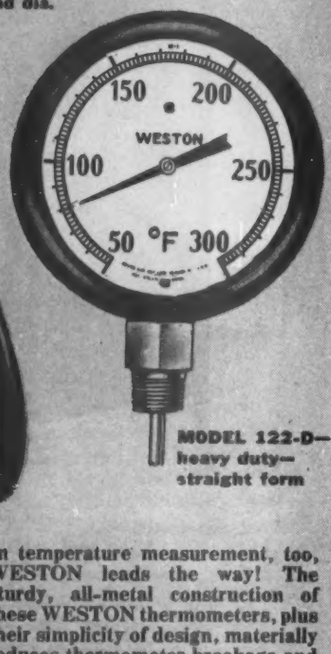
MAX-MIN MODEL—
Shows high or low temperatures reached since last setting

it's Weston
IN TEMPERATURE MEASUREMENT, TOO!

MODEL 221-D—
3" head dia.



MODEL 222-D—
heavy duty—
angle form



MODEL 122-D—
heavy duty—
straight form

MODEL 226-L—
Laboratory Model

In temperature measurement, too, WESTON leads the way! The sturdy, all-metal construction of these WESTON thermometers, plus their simplicity of design, materially reduces thermometer breakage and maintenance, and safeguards their high initial accuracy over long periods of time. Available in sizes, types and stem lengths for most applications. For information on the complete line see your jobber, or local WESTON representative. Weston Electrical Instrument Corporation, 617 Frelinghuysen Avenue, Newark 5, N. J.

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SEATTLE · ST. LOUIS · SYRACUSE · IN CANADA, NORTHERN ELECTRIC CO., LTD., POWERLITE DEVICES, LTD.

Semple Torsion Tester

Designed to determine the low temperature flexibility of elastomers under torsion, the No. D-2043 Torsion Tester has been developed and introduced by the Semple Developments Co., 1324 No. Rockhill Road, St. Louis 17, Missouri. It is specifically recommended by the

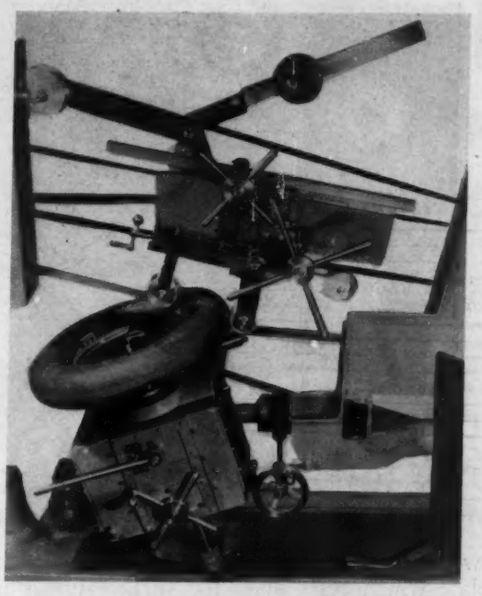
manufacturer for work on plasticized polyvinyl chloride and polyvinyl chloride acetate. The tester is 27 inches high, 19 inches long and 8 inches wide. It weighs 27 pounds. The stirrer motor is of 1/20 h.p., and the heater of 180 watts. All surfaces are enameled, plated or stainless steel. The new instrument is said to be available for immediate delivery.

Tachometer Production Recorder

A new speed and production recorder which furnishes a continuous record of operating speed, showing the slightest irregularity in speed, as well as idle time, has been developed by the Electric Tachometer Corp., 22nd and Vine Sts., Philadelphia 7, Penna. Named the Model R-300-H, the gear-driven unit consists essentially of a synchronizing contractor which may be attached to and driven by the prime mover or industrial machine. A unique patented step-by-step motor in the recording instrument is electrically connected to the contactor and follows its motion. This motor, by means of gear and feed screw, drives a steel stylus across a wax-coated chart. At one-half minute intervals the master clock, an integral part of the system, makes contact to disengage the feed screw which is revolved backwards by a return spring restoring the pen arm to zero. The same contact feeds the chart downward at the rate of two inches per hour. This cycle of operations, when repeated, produces a series of parallel lines, the length of which is proportional to speed or production. The ends of the lines form a speed curve. The new recorder is guaranteed to have an accuracy of one-half of one percent of full scale.

Improved Air Bag Buffing Machine

The National Sherardizing & Machine Co., 868 Windsor St., Hartford, Conn., has added a new feature to its well-known air bag buffing machine. The gear box can now be tilted to approximately 20°, as indicated in the accompanying illustration. This improved tilting feature enables the operator to buff closer to the bead

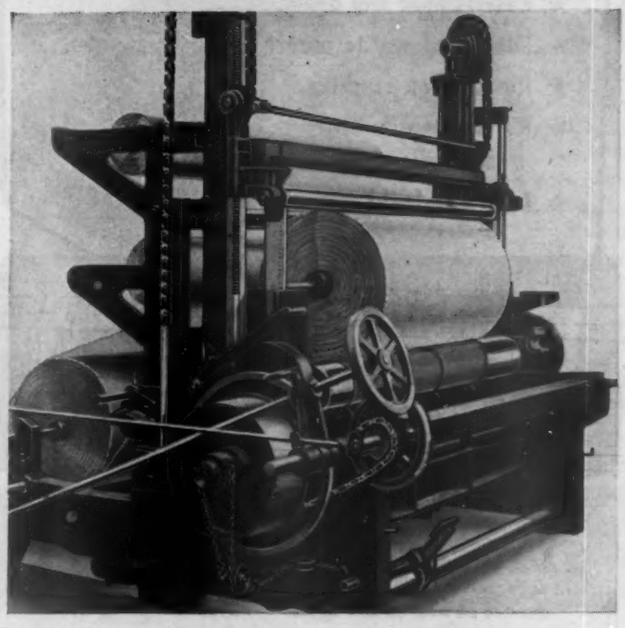


and the extreme outside diameter of the air bag. This feature is now standard equipment on all air bag machines manufactured by the company. The machines are furnished complete with motors, V-belt drives and exhaust hoods. The gear box is equipped with a two-speed clutch and is raised and lowered by hand wheel. Three individual aluminum air bag holding rings are furnished with each machine, and additional size rings can be supplied. The company's No. 2 Air Bag Buffing Machine measures 3½ by 11 feet in size, and has a net weight of 3,720 pounds and a shipping weight of 4,100 pounds.

FOR HIGH ABRASION FURNACE
USE PHILBLACK O
FOR FURTHER DETAILS, SEE AD ON PAGE 4

Camachine 10-20

for men with IDEAS!



CAMACHINE 10-20 is a mighty useful machine to have in a rubber plant. It's a fast, heavy duty slitter and rollwinder, and its outstanding quality is *versatility*. The 10-20 produces top quality rewound rolls from webs of all types of plain and friction coated fabrics, paper, rubber and synthetic rubber, from thin gutta-percha tape to heavy brake lining. It can be adapted to cut and wind strip as narrow as ½". It winds tacky rolls alternately on separate rewind shafts, for positive roll separation. It inserts liner cloth in rewound rolls, or rewinds liner from the original roll. It handles web up to 72" wide, and produces top quality rewound rolls up to 36" in diameter. Obviously a machine for men with practical ideas about increased production, improved quality and lower costs. Built by

Cameron Machine Co., 61 Poplar Street, Brooklyn 2, N. Y.

Camachines
FOR FAST, TOP QUALITY ROLL PRODUCTION
...the world over

Accelerator 2-MT

by

DU PONT

Has many advantages in rubber stocks

- ★ Resists heat and aging.
- ★ Little tendency to revert during long cures.
- ★ Resists flex cracking.
- ★ Retains tensile strength and tear resistance at elevated temperatures.
- ★ Low heat build-up.

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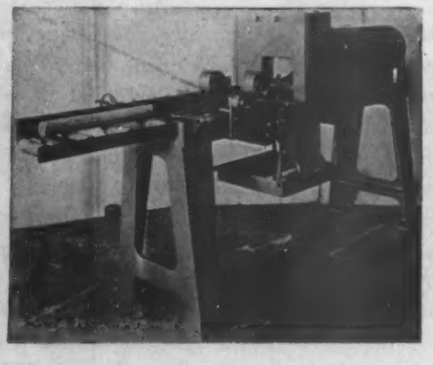
WILMINGTON 98, DELAWARE
BETTER THINGS FOR BETTER LIVING ...THROUGH CHEMISTRY
DU PONT

SLICER MACHINE FOR EXTRUDED STOCKS



With High Speed Disc Cutting Blade, Automatic Feed and with Tandem Feed Wheels. Capacity Section Up to 3" by 4½"—Length ⅛" to 4".

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MILWAUKEE—SHERIDAN 7020

Precision Rugosimeter Apparatus

An instrument designed for measuring the rugosity or surface roughness of calendered raw rubber sheet or similar samples is now being manufactured by the Precision Scientific Co., 3737 W. Cortland St., Chicago 47, Ill. The measurement made is essentially the resistance

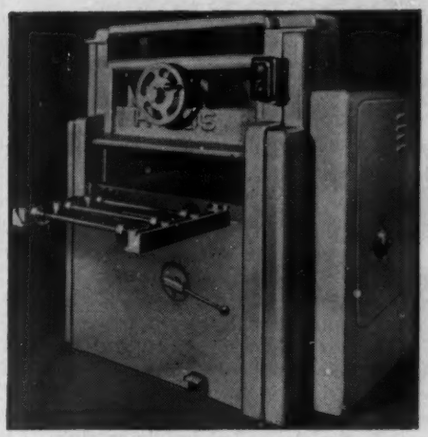
to flow of air between the rough surfaces and an annular test plate which rests upon the surface under the test. The apparatus consists essentially of the following elements in series: a constant-pressure air valve, a large needle valve with a calibrated scale, a manometer and an annular test plate. The needle valve is opened to the point at which the pressure on the manometer is one-half the pressure maintained by the constant-pressure valve. The resistance of the needle valve to the air flow is then equal to and measures the resistance of the test plate on the sample.

To measure tension or force in the "tight" spots found in many types of mechanical assemblies, W. C. Dillon & Co., Chicago 44, Ill., has developed a **miniature dynamometer.** Said to be the smallest of its kind, the case measures 3 inches in diameter, and the entire instrument weighs only 1 pound. It is available in 100, 250 and 500-pound capacities.

Designed to efficiently handle liquids at a high pressure drop, and more especially, flashing condensate, the **Type V-10 Flow Regulating Valve** has been introduced by the Swartout Co., Cleveland, Ohio. Because of its design, the valve is said to effectively eliminate any possible direct impingement and to provide an expanding outlet passage beyond the seat orifice, assuring orderly discharge characteristics and freedom from turbulence and noise of operation.

A new three-way, neutral position **hand operated valve,** called the No. 1291-N-3, has been developed by C. B. Hunt & Son, Inc., Salem, Ohio. Designed for use with single acting air cylinders, they are especially recommended by the company for use with hoists or other applications where it is desired to raise, lower and hold the load in an intermediate position.

CLEAN!
COMPACT!
POWERFUL!



The *New* HOBBS TRI-POWER DIE PRESS

Powerful, rugged compact construction assures long life of precision cutting. Head cannot twist or give under normal usage even on the heaviest of cuts.

The most modern die cutting press on the market. Rugged cutting power, completely enclosed in attractive steel walls for cleanliness, safety, and space economy. Fitted throughout with large roller and ball bearings. Available sizes, 24" x 38" and 24" x 44".

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PROCESSING EQUIPMENT

HAMMER MILLS

Continuous full capacity production. Hard iron, interchangeable grinding plates. Self-aligning bearings. Automatic electro-magnet separator prevents tramp metals from entering grinds. Sturdy construction. Designed by experienced engineers whose reputation is founded upon doing things right. Literature available. Inquiries invited.

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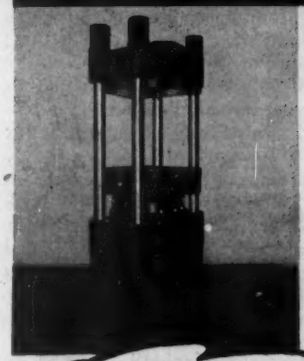
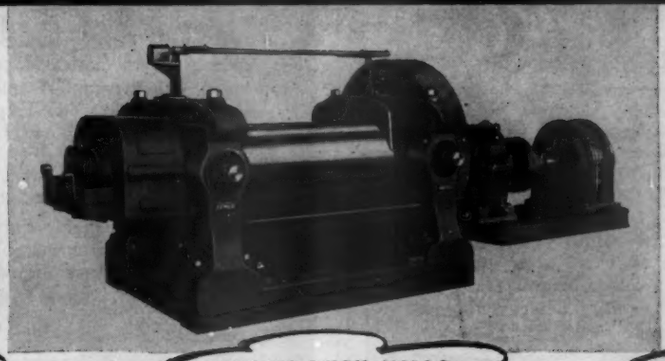
RUBBER & PLASTICS PROCESSING MACHINERY



PRESSES



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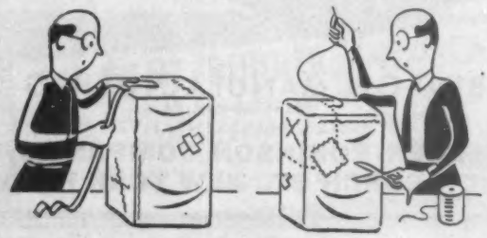

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REVIEWS

BOOKS

Mechanical Behavior of High Polymers. By Turner Alfrey, Jr. Published by Interscience Publishers, Inc., 215 Fourth Ave., New York 3, N. Y. 6 x 9 in. 582 pp. $9.50.

This is the sixth volume in the series of monographs on the chemistry, physics and technology of high polymeric substances being published under the general title of "High Polymers" under the editorship of Messrs. Mark, Marvel, Melville and Whitby. As indicated by its title, this work treats with the mechanical behavior of these polymers. No attempt has been made to catalog the mechanical properties of the whole myriad of known high polymers, since in many cases no sufficiently fundamental studies have been carried out, but the author has covered the fundamental principles underlying the mechanical behavior of the polymers, and has shown how such behavior is correlated with the molecular structures involved.

Dr. Alfrey has classified the polymeric structures into four groups, namely, amorphous linear polymers, cross-linked polymers, crystalline polymers, and polymers admixed with components of low molecular weight. A chapter is devoted to each type of structure. The analysis of the mechanical behavior of each type of polymer is made on two levels—a phenomenological description and a molecular interpretation. In each case, the discussion starts with an analysis of the molecular structure, and the phenomenological and mechanistic analyses of mechanical behavior are developed side by side.

The book has six chapters in all, as follows: (1) Introduction; (2) Plastoelastic Behavior of Amorphous Linear High Polymers; (3) Three-Dimensional Cross-Linked Polymers; (4) Crystallization of High Polymers; (5) Plasticization and Solution—Systems Containing High Polymers and Materials of a Low Molecular Weight; (6) Ultimate Strength and Related Properties. In addition there are four appendices, covering the following: (a) Tensor Representation of Stress and Strain; (b) Various Mathematical Methods of Specifying Viscoelastic Properties; (c) Tensor Treatment of Nonhomogeneous Stresses in Viscoelastic Media; (d) Experimental Methods in the Scientific Mechanical Testing of High Polymers. A subject index is included.

As the author indicates in his preface, a number of significant developments have been reported since preparation of this book passed the revision stage. Particular reference is made to the work of Tobolsky and co-workers, O'Shaugnessy, Eley, and Kirkwood. This is just an indication of how rapidly research work on the high polymers is progressing.

•

Rubber in Textile Factories. By Colin Macbeth. Issued by the British Rubber Development Board, Market Buildings, Mark Lane, London, E.C. 3, England. 5½ x 8½ in. 136 pp.

The latest handbook to the series of publications dealing with the use of rubber in various industries published by the British Rubber Development Board treats with the use of rubber in textiles. Although the uses of rubber in industry are manifold, it is doubtful whether it is used to as great an advantage as in textile factories where its resilience protects yarns and fabrics from undue damage during their processing and treatment. The handbook deals with power transmission for the most part. Data is furnished on solid woven, cord constructed and accessory belts, as well as V-belt drives and vulcanized joints for belts. Useful points on belting installations and on their proper use, as well as hints on the selection and settling of V-drive details, are included. One chapter discusses the advantages offered by rubber-to-metal items as anti-vibration agents for looms, etc., and includes suggestions on how other such items could be utilized. Numerous illustrations are used in the handbook.

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Available with any number of openings. Steam heated or electric platens available at slight cost. Larger platens and motor-driven hydraulic power units are also available. Features of this M & N press include the visual ture indicator, dual pressure hand pump, electrically heated and thermostatically controlled platens, all steel construction, and large platen areas.

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SIZE OF BASE	16" x 12"	DAYLIGHT OPENING	10"
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PLATEN SIZE	12" x 12"	RAM DIAMETER	5"
CAPACITY	30 tons	APPROX. WEIGHT	400 lbs.

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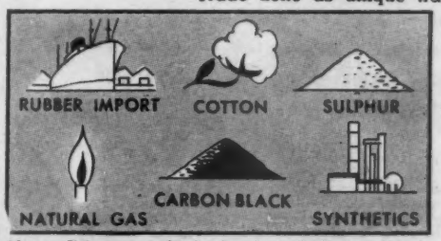

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REVIEWS (CONT'D)

Industrial Weighing. By Douglas M. Considine. Published by Reinhold Publishing Corp., 330 West 42nd St., New York 18, N. Y. 6 x 9 in. 560 pp. $10.00.

Despite the fact that scales of all kinds and sizes are found in practically every factory, from the gigantic platform type designed for loaded trucks to finely graduated batch scales for essential chemical compounding, the principles of weighing equipment and their intricate mechanism are rarely understood by the users. This book, therefore, fills a wide gap in the literature. It describes the great advances made in scale engineering in recent years, especially regarding new types of design and wider application of scales throughout industry and commerce. It is intended particularly for those who use scales, as well as for students, designers and engineers.

For maximum convenience and usefulness, the author has divided the book into two parts. Part I treats with scale design, construction and operation, and Part II with scales in industry. The first part is recommended for those who desired a review of basic scale mechanics, of design and construction of modern scales, and of scale installation and maintenance. Part II will prove of more interest to those concerned with the application of scales.

As might be expected, the author has devoted a complete chapter to the "Rubber and Plastics Industries," with concentration on rubber applications. Dividing the rubber industry into four major segments—plantations, copolymer plants, processing plants and reclaiming plants—the numerous types of weighing equipment are described and illustrated. A schematic flow diagram of a typical rubber compounding system, employing a Banbury, emphasizes the importance of weighing equipment in the field. An interesting summary of weighing operations in both the rubber and plastics fields is given in table form. The chapter on rubber and plastics represents the most comprehensive data available to date on weighing equipment in these fields.

•

Di-Acro System of Die-Less Duplicating. O'Neil-Irwin Manufacturing Co., Lake City, Minnesota. 8½ x 11 in. 40 pp.

This catalog presents all information on the company's line of die-less duplicating machines. Specifications and capacities for the different precision machines discussed are included, as well as photographs which show the machines in actual operation. A section of the catalog is devoted to illustrating production examples of die-less duplicating, and attention is given to several new machines which the company has recently introduced. A listing of firms using the firm's duplicating machines is provided. The catalog has been provided with an introduction which outlines the origin of the die-less duplicating system.

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BOOKLETS, CATALOGS, etc.

The Synthetic Fibres Industry. George S. Armstrong & Co., Inc., 52 Wall Street, New York, N. Y. 8½ x 11 in. 68 pp.

This volume represents the eighth in a series on "An Engineering Interpretation of the Economic and Financial Aspects of American Industry." It presents a complete discussion and review of the synthetic fibers industry. The historical development, kinds, qualities and improvements in synthetic fibers are considered. Portions of the volume are devoted to the uses and consumption of synthetic fibers. Price differentials as factors in the competitive interplay among natural and synthetic fibers are discussed at length. The composition of the industry and the economic factors in the production of synthetic fibers, and the future prospects for synthetic fibers in the United States are also considered. The booklet contains many different charts and tables which serve to illustrate such matters as the physical properties of the fibers in question, uses, consumption, production, shipments, price differentials, investments, approximate prices, personnel involved, costs, etc.

•

Precipitated Calcium Carbonates. Industrial Chemical Sales Division, West Virginia Pulp & Paper Co., 230 Park Ave., New York 17, N. Y. 8½ x 11 in. 48 pp.

The manufacture, properties and applications of the company's precipitated calcium carbonates—both Snow Top, which meets U.S.P. requirements, and Caltech, for various technical purposes—are discussed in this two-color booklet. Methods of measuring whiteness, test procedures, particle size data and chemical properties are given in detail, with graphs, tables, charts and electron micrographs liberally used. Appendices are devoted to the use of the microscope for dimensional counts of particles and to the Microsizer, a new instrument designed by the company for determining the sizes of particles occurring in finely divided materials, such as pigments and fillers for paper making. A schematic layout of the Microsizer is included.

•

Ransburg Coating Processes. Harper J. Ransburg Co., 1204 Barth Ave., Indianapolis 7, Ind. 8½ x 11 in. 16 pp.

The company's specially-developed electrostatic painting methods are described in this new booklet, which includes more than twenty-five typical electrostatic spray installations in as many industries. One section of the booklet explains the principles of electrostatic spray and how the electrostatic coating zone creates a "wrap-around" thus causing an even flow of atomized paint particles to all exposed exterior contours of the product being painted.

•

Blaw-Knox Resin Plants and Equipment. (Bulletin No. 2087). Blaw-Knox Division of the Blaw-Knox Co., Pittsburgh, Penna. 8½ x 11 in. 24 pp.

Services offered by the company in the construction of equipment and complete plants for the resin industry and all allied fields are outlined in this bulletin. Liberal use is made of photographs and schematic drawings. Included among equipment covered are tumbling blenders, heating units, process kettles, agitators, and high temperature heating systems. Some attention is also given to drives and instrumentation.

•

Cochrane C-B System. Cochrane Corp., 17th St. and Allegheny Ave., Philadelphia 32, Penna. 8½ x 11 in. 20 pp.

Operation of the company's high pressure condensate return system is fully outlined in this new bulletin, with new technical data furnished on turbulent versus laminar steam flow and the effects of air and condensate films on heat exchange characteristics. Improved equipment for the positive removal and drainage of condensate is also described for the first time. Typical case histories are reported in detail.

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REVIEWS (CONT'D)

Aero Brand Metallic Soaps. Industrial Chemicals Division, American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y. 4 x 9 in. 8 pp.

The various Aero Brand metallic soaps made by the company for the rubber, plastics and other industries, including aluminum, calcium, magnesium and zinc stearates are described in this pamphlet, with the specifications given in each case. The special advantages offered to different products by the different soaps are emphasized. These soaps are reported to be produced in an extremely small, uniform particle size, which is said not only to increase the effectiveness of the soaps in present applications, but to open up new applications as well.

•

The Selection and Use of Fatty Acids. Chemical Division, Armour and Co., 1355 West 31st St., Chicago 9, Ill. 8½ x 11 in. 16 pp.

This booklet outlines the major fields of usage for the various fatty acids and their derivatives, including rubber compounding, explaining for each field the properties required, functions performed, and types of acids commonly used. The company's chemicals from fats include the Neo-Fats, Armeens, Armacs, Armids and Arneels. Fields of use covered in the booklet, in addition to rubber, include chemicals, inks, paper, plastics, protective coatings, putties, and textiles. The average composition and constants of Neo-Fat fatty acids are given.

•

Directory of Manufacturers in St. Louis. Chamber of Commerce, St. Louis, Mo. 8½ x 11 in. 74 pp. $3.00.

This directory contains some 4,000 classified listings of products manufactured by over 2,700 firms in the St. Louis industrial area. Commodities are divided into twenty-one major groups covering twenty principal divisions of industry and one miscellaneous division. Each division in turn is divided into various sub-divisions. The directory is divided into three sections, the first listing products alphabetically, the second being a classified list of products, and the third alphabetically listing all companies.

•

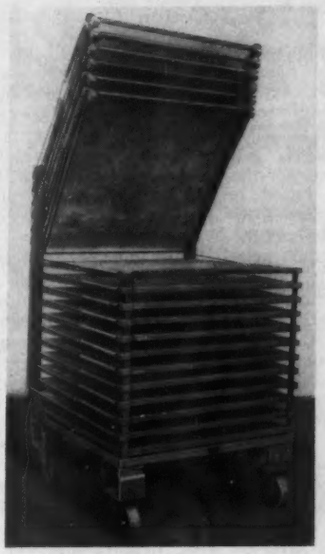
Tri-Homo Homogenizer. Tri-Homo Corporation, Salem, Mass. 8½ x 11 in. 8 pp.

The development, operation and advantages of the company's Tri-Homo Homogenizer, the unit which furnishes triple dispersion in a single operation, and which finds application in connection with both rubber and latex dispersions, are outlined in this booklet. The triple dispersion effect is described in both text and by schematic drawings. Production capacities are listed.

FOR HIGH ABRASION FURNACE USE PHILBLACK O

FOR FURTHER DETAILS, SEE AD ON PAGE 4

New Stock Cooling Rack



This new Rack gives unobstructed access to three sides of each tray and offers a convenient method for storing materials that require cooling or air drying. Trays are spring supported and can be quickly raised or lowered, free from all locking devices. Racks having 18 perforated trays 36" x 36" or plain surface trays 36" deep by 4 ft., 6 ft. and 8 ft. long, can be furnished either stationary or mounted on casters.

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- Has micro-adjustment for accurate widths.
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- Has base with rollers and is very easy to handle.

Cuts within 1/64 inch to 1/100 inch tolerance depending on grades of rubber. Cuts a slab down to the last shaving. Cuts all grades of rubber including pure gum, sponge, etc. Cuts squarely—no rejects.

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MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, APR. 9, 1948

Natural Rubber

The price of spot rubber on the Commodity Exchange has swung in the relatively wide range of 362 points since our last report (March 10), high for the period being 23.12 cents on April 9 and low 19.50 cents on March 11, the first day of the period. The 19.50-cent quotation was also the low for the preceding period. The average price of spot rubber for the month of March was 20.33 cents, based on 22 trading days.

As a glance at the closing prices for spot rubber on the Exchange printed on this page will indicate, prices have been moving steadily upward. The peculiar part of the current advance is that it has occurred without any appreciable change in conditions surrounding the market. Factories are still buying cautiously, but increased activity on the part of dealers has been noticed. Some quarters are inclined to credit the price advance to military developments, particularly the recent request of the Armed Services for greatly expanded facilities.

Shipments from Malaya have been slowing up of late. Combined total shipments for February and March amounted to only 56,129 long tons, which is a far cry from probable domestic consumption for the second quarter of the year. This indicates that total arrivals in April and May will fall short of consumer usage, which will probably be reflected in a sharp reduction of stocks on hand available to the industry. There is also some talk of renewed government buying for stockpile purposes.

Today's quotations in the outside market, London and Singapore, follow:

Outside Market

No. 1 Ribbed Smoked Sheets:	
Spot	.23¼
June	.22
July-September	.21⅜
Thin Latex Crepe:	
Spot	.26
June	.25
Thin Brown Crepe, No. 2	.17½
Ambers, No. 3	.17½
Flat Bark Crepe	.13

London Market

(Standard Smoked Sheets)

July-September	21.04 - 21.15
October-December	20.63 - 20.73

Singapore Market

(Standard Smoked Sheets)

May	19.52 - 19.62

Synthetic Rubber

(Dry Types)

Butaprene NXM	.470 - .495
Chemigum 30 N4NS	.400 - .470
Chemigum 50 N4NS	.400 - .470
Chemigum N3	.450 - .520
Hycar OR-25	.400 - .425
Hycar OR-15	.470 - .495
Hycar OS-10	.400 - .425
Neoprene Type E	—— - .650
Neoprene Types CG and AC	—— - .500
Neoprene Types FR and KNR	—— - .750
Neoprene Type S	—— - .320
Neoprene Type NC	—— - .250
Perbunan 18	.390 - .415
Perbunan 26	.400 - .425
Perbunan 35	.470 - .495
Thiokol Type A	.370 - .470
Thiokol Type ST	.750 - .850
Thiokol Type FA	.520 - .620
Thiokol PR-1	.750 - .850

Scrap Rubber

The demand for scrap rubber has again hit the doldrums, with very little stock moving. Even the rising price of natural rubber has had no effect on the market. Inventory positions on the part of the reclaimers are obviously quite satisfactory at the moment and scrap dealers are convinced they must await depletion of such inventories. One or two minor adjustments in prices have occurred since our last report. Current quotations follow:

(Prices to Consumers, Delivered Akron)

Mixed passenger tires	ton	$12.00
Beadless truck tires	ton	nom.
Mixed truck tires	ton	nom.
Beadless passenger tires	ton	nom.
No. 1 passenger peelings	ton	42.50
No. 1 truck peelings	ton	42.50
Red passenger tubes	lb.	.06
Black passenger tubes	lb.	.03¾
Mixed passenger tubes	lb.	.03¾
No. 2 truck tubes	lb.	nom.
Red truck tubes	lb.	nom.
Black truck tubes	lb.	.03½
Buffings	ton	15.00

Reclaimed Rubber

Although the demand for reclaim has relaxed somewhat in recent months, some reclaimers continue to operate at near-capacity to meet customer demand. Consumption figures reflect the situation, with 25,885 long tons being consumed in January as against 27,715 tons in January, 1947, and 22,017 tons in February as against 25,484 tons a year ago. No changes in price have been reported. Current quotations follow:

Tires			
Black, Acid	lb.	.08¾ @	.09¼
Black, Digester	lb.	.08 @	.08½
Peels	lb.	.09 @	.09½
GR-S Whole Tire	lb.	.08½ @	.09
Inner Tubes			
Black	lb.	.12¾ @	.13¼
Red	lb.	.13½ @	.14
GR-S	lb.	.09½ @	.10
Butyl	lb.	.08½ @	.09
Shoe			
Unwashed	lb.	.08¼ @	.08¾

Cotton Tire Fabrics

Despite the spiralling raw cotton prices, demand for cotton tire fabrics and chafers has dropped to a new low, with few tenders being made in the trade. Even export inquiries are lacking, and most mills are simply marking time until demand picks up. An early increase in such demand is anticipated, especially once the ERP swings into full movement. No change has been made in the price structure. Current quotations follow:

Standard, Peeler, 12/4/2	lb.	.7600
Standard, Peeler, 14/4/2	lb.	.7800
Standard, Peeler, 16/4/3	lb.	.8050
Extra Staple, Peeler, 12/4/2	lb.	.8575
Extra Staple, Peeler, 14/4/2	lb.	.8775
Extra Staple, Peeler, 16/4/3	lb.	.9025

Chafers

14.4 oz. (per sq. yard)	lb.	.7550
9.25 oz. (per sq. yard)	lb.	.7125
11.65 oz. (per sq. yard)	lb.	.6850
8.9 oz. (per sq. yard)	lb.	.7275

Cotton

The price of middling uplands on the Cotton Exchange has swung in a range of 3.11 cents since our last report (March 10), high for the period being 37.69 cents today (April 9), and low 34.58 cents on March 11. The average price of middling uplands for the month of March was 35.04 cents based on 25 trading days. This compares with an average of 33.63 cents for the month of February.

Cotton prices have advanced sharply during this period to new high levels for the season and for the life of the contracts. There was heavy price fixing against sales of cotton to both domestic and foreign mills. The sharp advance has been due to the expanding export outlook, a somewhat firmer gray goods market, and a growing scarcity of spot cotton.

As far as could be learned in the trade no definite approval has been given the Japanese credit plan, although the Army is said to be pressing for its consummation. Some cotton men have become very discouraged by these negotiations, yet reliable authorities in Washington claim it is still "on the fire."

Officials of the State and Agriculture Departments say it might be possible to spend ERP money on foreign cotton for emergencies in starting the aid program, but final word will come in the actual appropriation bills which will specifically authorize or outlaw such purchases.

Quotations for middling uplands on the Exchange follow:

	Mar. 10	February 10		
	Close	High	Low	Close
July	32.88	36.21	35.59	36.16
October	29.66	32.72	32.50	32.72
December	——	31.95	31.77	31.95

Closing Rubber Prices on New York Commodity Exchange

FROM MARCH 11 TO APRIL 9

Mar. Date	Spot	May	July	Sept.	Dec.	Sales
11	19.50	19.10	18.45	18.05	17.60	34
12	19.62	19.25	18.60	18.10	17.70	74
13	——	——	——	——	——	——
14	——	——	——	——	——	——
15	20.00	19.58	19.00	18.68	18.15	173
16	19.75	19.45	18.95	18.35	18.25	30
17	19.88	19.46	19.04	18.65	18.45	102
18	20.37	20.05	19.75	19.40	19.10	296
19	20.37	20.00	19.50	19.20	19.05	135
20	——	——	——	——	——	——
21	——	——	——	——	——	——
22	20.62	20.40	20.10	19.90	19.75	89
23	20.88	20.60	20.20	20.00	19.90	139
24	20.75	20.33	20.00	19.70	19.70	99
25	21.00	20.52	20.20	19.90	19.80	41
26	——	——	——	——	——	——
27	——	——	——	——	——	——
28	——	——	——	——	——	——
29	21.75	20.99	20.60	20.39	20.10	140
30	21.62	21.35	21.00	20.60	20.50	161
31	21.82	21.35	21.00	20.75	20.60	256
April						
1	22.00	21.40	20.95	20.60	20.55	116
2	21.50	21.75	21.15	20.77	20.65	181
3	——	——	——	——	——	——
4	——	——	——	——	——	——
5	22.00	21.50	20.65	20.50	20.20	124
6	22.62	21.95	21.00	20.70	20.60	198
7	22.82	21.90	20.95	20.50	20.35	41
8	22.82	22.00	20.95	20.55	20.55	74
9	23.12	22.20	21.10	20.65	20.40	223
10	——	——	——	——	——	——
11	——	——	——	——	——	——

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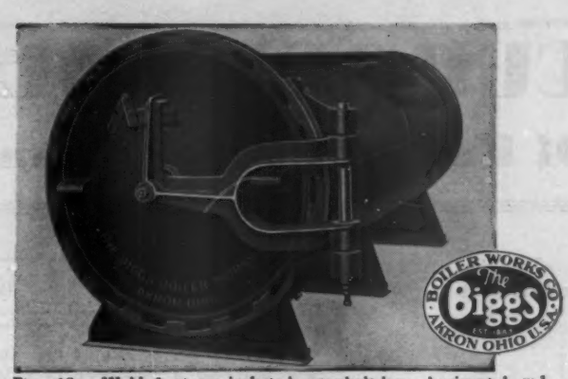

Fig. 17. Welded steam-jacketed, staybolt-less, horizontal vulcanizer with quick-opening door. All sizes; various working pressures. Low maintenance.

BIGGS Vulcanizers are Standard Equipment in the Rubber Industry

Biggs-built vulcanizers and devulcanizers have always had a prominent place in the development of the rubber industry. For over 47 years Biggs has furnished single-shell and jacketed vulcanizers both vertical and horizontal, as well as many different types of devulcanizers. Biggs modern all-welded units with quick-opening doors are available in all sizes for various working pressures—with many special features.

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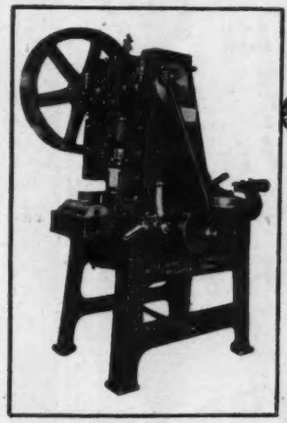
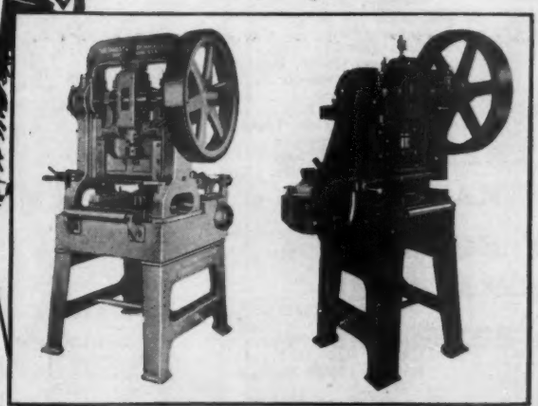


MODEL A-1



MODEL A-2 MODEL A-3

- Model A-1 For HEELS at high speed production, or short runs.
- Model A-2 For Multiple HEELS, HALF and FULL SOLES with stock grain.
- Model A-2S (Not Illustrated) For cutting crosswise of grain of stock.
- Model A-3 For Multiple HEELS and TAPS with or across stock grain.

Here is the *Rubber Cutting Machine* that will *cut with* or across the stock grain, either singular or in multiples—from a strip of stock direct from the warming mill.

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CURRENT MARKET PRICES

Of Rubber Chemicals and Compounding Ingredients

APRIL 9, 1948

Prices are, in general, f.o.b. works. Range of prices indicates grade or quantity variations.

Abbreviations: bbls., barrels; c.l., carlot; cyl., cylinder; dlvd., delivered; dms., drums; l.c.l., less than carlot; M.B., masterbatch; min., minimum; ref., refined; sap., saponified; sp., special; syn., synthetic; t.c., tank cars.

—The arrangement of this section follows closely the Chemical Section of the 1947 RUBBER RED BOOK to which readers are referred to determine the classification of any material or brand name. —Although suppliers of every material were contacted for price information, only those materials are listed for which quotations have been furnished us. The quotations are not guaranteed and prospective purchasers should contact suppliers for confirmation before placing orders. Suppliers are requested to send us regularly current prices on all of their materials used in the rubber industry. —All requests for information or listings should be sent to Market Editor, RUBBER AGE, 250 West 57th St., New York 19, N. Y.

ACCELERATORS

A-1	lb.	.34	.39
A-10	lb.	.40	.47
A-19	lb.	.52	.58
A-32	lb.	.59	.69
A-77	lb.	.42	.55
A-100	lb.	.42	.55
Accelerator No. 8 (dlvd.)	lb.	——	.75
Accelerator No. 49	lb.	.44	.45
Accelerator No. 89 (dlvd.)	lb.	——	1.20
Accelerator No. 122 (dlvd.)	lb.	——	1.30
Accelerator No. 552 (dlvd.)	lb.	——	1.63
Accelerator No. 808 (dlvd.)	lb.	.59	.61
Accelerator No. 833 (dlvd.)	lb.	1.13	1.15
Acrin (dlvd.)	lb.	——	.65
Advan	lb.	.52	.55
Altax	lb.	.35	.37
Arazate	lb.	——	2.16
Beutene	lb.	.59	.64
B-J-F	lb.	.27	.32
Butasan	lb.	——	1.10
Butazate	lb.	——	1.00
Butyl Eight	lb.	1.00	1.05
Captax	lb.	.27	.29
C-P-B	lb.	——	1.95
Cumate	lb.	——	1.45
Cuprax	lb.	.60	.62
Dibenzo G-M-F	lb.	——	2.65
Diorthotolylguanidine (dlvd.)	lb.	.48	.50
Diphenylguanidine (dlvd.)	lb.	.39	.40
El-Sixty	lb.	.39	.46
Ethasan	lb.	——	1.10
Ethazate	lb.	——	1.00
Ethyl Thiurad	lb.	——	1.25
Ethyl Tuex	lb.	——	1.00
Formaniline (dlvd.)	lb.	——	.40
G-M-F	lb.	——	2.50
Good-rite Erie	lb.	.53	.55
Guantal	lb.	.43	.50
Hepteen	lb.	.42	.48
Base	lb.	1.80	1.90
Ledate	lb.	——	1.00
Mercaptobenzothiazole	lb.	.27	.32
Mercaptobenzothiazyl Disulfide	lb.	.35	.40
Methasan	lb.	——	1.20
Methazate	lb.	——	1.00
Monex	lb.	——	1.10
Mono Thiurad	lb.	——	1.25
Morfex 33	lb.	.53	.58
2-MT (dlvd.)	lb.	.58	.60
Novac	lb.	——	1.40
A-13	lb.	.65	.67
O-X-A-F	lb.	.34	.39
Pentex	lb.	.74	.78
Flour	lb.	.12¼	.13¼
Phenex (tons)	lb.	——	.40
Pipazate	lb.	——	1.53
Pip-Pip	lb.	——	1.63
R-2 Crystals	lb.	——	1.55
Rotax	lb.	.39	.41
SA 52	lb.	——	1.10
SA 57	lb.	——	1.00
SA 62	lb.	——	1.00
SA 66	lb.	——	1.45
SA 67	lb.	——	1.00
SA 77	lb.	——	1.00
Safex	lb.	——	1.15
Santocure	lb.	.53	.60
Selazate	lb.	——	1.45
Selenac (Ethyl, Methyl)	lb.	——	1.45
Setsit-5	lb.	.75	1.00
SPDX-G (tons)	lb.	——	.59
Tellurac	lb.	——	1.45
Tepidone (dlvd.)	lb.	——	.55
Tetrone (dlvd.)	lb.	——	1.25
A (dlvd.)	lb.	——	1.85
Thiocarbanilide (dlvd.)	lb.	——	.34
Thiofide	lb.	.35	.42
Thionex (dlvd.)	lb.	——	1.10
Thiotax	lb.	.27	.34
Thiurad	lb.	——	1.25
Thiuram E (and M) (dlvd.)	lb.	1.00	1.10
Trimene	lb.	.54	.64
Base	lb.	1.03	1.18
Triphenylguanidine (dlvd.)	lb.	——	.50
Tuads (Ethyl, Methyl)	lb.	1.00	1.10
Tuex	lb.	——	1.10
Ultex (tons)	lb.	——	1.23
Ureka	lb.	.55	.62
Blend B	lb.	.55	.62
C	lb.	.52	.59
Vulcanex (dlvd.)	lb.	——	.45
Z-B-X	lb.	——	2.45
Zenite (dlvd.)	lb.	.33	.35
A (dlvd.)	lb.	.42	.44
B (dlvd.)	lb.	.39	.41
Zenite Special	lb.	.34	.36
Zimate (Butyl, Ethyl)	lb.	——	1.00
Zimate, Methyl	lb.	——	1.00

ACTIVATORS

Blue Lead, Sublimed (dlvd.)	lb.	.15¼	.15½
Fish Oil, Hydrogenated, Fatty Acid			
Hydrofol Acid (dlvd.)	lb.	.28¾	.32¼
Hyfac 52 (dlvd.)	lb.	.29	.30
Neo-Fat H.F.O. (dlvd.)	lb.	.33	.34
Stearex Beads (dlvd.)	lb.	.28	.29½
Lime, Hydrated			
Arrowhead	ton	16.00	19.50
Sierra	ton	16.00	19.50
Litharge			
Eagle (dlvd.)	lb.	.166	.176
FBS (dlvd.)	lb.	.166	.176
Magnesium Oxide, Heavy			
General Magnesite	lb.	.05½	.08
Michigan No. 15	lb.	.05	.05½
Permanente	lb.	.05	.06½
Magnesium Oxide, Light			
Baker's (Neoprene Grade)	lb.	——	.28
General Magnesite (Neoprene Grade)	lb.	——	.28
General Magnesite No. 101	lb.	——	.175
General Magnesite Standard	lb.	——	.22
K & M	lb.	——	.28
Michigan No. 30	lb.	——	.22½
No. 40	lb.	.25	.28
Witco Extra Light	lb.	.25	.27
Oleic Acid			
Elaine O-18 (dlvd.)	lb.	.24½	.26¾
L.C.P. Red Oil	lb.	.25½	.27¼
Red Oil (20-24 Saponified) (dlvd.)	lb.	.30½	.32¾
Palm Oil Fatty Acid (c.l.)	lb.	——	.11
Potassium Oleate (drums)	lb.	——	.29½
Red Lead			
No. 2 RM (dlvd.)	lb.	.181	.191
Sodium Laurate (drums)	lb.	——	.19
Sodium Oleate—Powder (drums)	lb.	——	.35
Paste (drums)	lb.	——	.20
Sodium Stearate—Powder (drums)	lb.	——	.35
USP Grade (drums)	lb.	——	.37
Stearic Acid, Single Pressed			
S-24 (dlvd.)	lb.	.32½	.33½
Stearex B (dlvd.)	lb.	.31½	.32½

ACTIVATORS (Cont'd)

Stearic Acid, Double Pressed			
Alba (dlvd.)	lb.	.39¼	.41¾
S-2-A (dlvd.)	lb.	.37	.39½
S-2-B (dlvd.)	lb.	.36½	.39
Stearic Acid, Other			
Neo-Fat 1-60 (dlvd.)	lb.	.37½	.39
Neo-Fat 1-65 (dlvd.)	lb.	.38½	.39½
Stearite	cwt.	36.00	38.00
White Lead Carbonate (dlvd.)	lb.	.16	.16½
Zinc Laurate (c.l.)	lb.	——	.29
Laurex	lb.	.32	.35
Zinc Stearate	lb.	.51	.52
Aquazinc	lb.	.20	.35

Unclassified Activators

Actifat (dms.)	lb.	——	.18
Acidex	lb.	.19	.32
Aero Ac 50	lb.	.50	.56
165	lb.	.37	.39
Barak (dlvd.)	lb.	——	.60
D-B-A	lb.	——	1.95
Delac J	lb.	.55	.60
P	lb.	.45	.52
Dibutylamine No. 117 (l.c.l., dms.)	lb.	——	.69
Palmalene (drums)	lb.	——	.15
Dutch Boy Normasal	lb.	——	.38¾
Polyac (dlvd.)	lb.	——	1.40
Ridacto (drums)	lb.	.22	.24
Snodotte (dlvd.)	lb.	.30½	.31½
SOAC (min. 10 dms.)	cwt.	——	12.00
Triamylamine No. 180 (l.c.l., drums)	lb.	——	1.01

ANTI-COAGULANTS

Anhydrous Ammonia (l.c.l.)	lb.	.02½	.02¾
National (cyl., dlvd.)	lb.	.16	.20
Aqua Ammonia (l.c.l., dms.)	lb.	——	.03
M.B.M. (l.c.l.)	lb.	——	.35

ANTI-FOAMING AGENTS

Aero Anti Foam H	lb.	——	.12
Regular	lb.	——	.08¼

ANTI-OXIDANTS

Agerite Alba	lb.	2.20	2.30
Gel	lb.	.55	.57
Hipar	lb.	.76	.78
H. P.	lb.	.58	.60
Powder	lb.	.43	.45
Resin	lb.	.60	.62
Resin D	lb.	.43	.45
Stalite	lb.	.43	.45
White	lb.	1.35	1.45
Akroflex C (dlvd.)	lb.	.58	.60
Aminox	lb.	.43	.52
Aranox	lb.	——	2.15
Benzoquinone	lb.	1.50	1.75
Betanox Special	lb.	.61	.70
B-L-E	lb.	.43	.52
Powder	lb.	.61	.63
B-X-A	lb.	.43	.45
Carvacrol	lb.	——	.85
Chlorcarvacrol	lb.	——	2.45
Flectol H	lb.	.43	.50
Flexamine	lb.	.58	.61
Gallic Acid, Tech.	lb.	1.10	1.23
USP or NF	lb.	1.27	1.40
Hydroquinone	lb.	.90	.90
Monomethylparaminophenol Sulfate	lb.	2.40	2.90
Neozone Standard (dlvd.)	lb.	.66	.68
A (dlvd.)	lb.	.43	.45
C (dlvd.)	lb.	.47	.49
D (dlvd.)	lb.	.43	.45
Oxidex	lb.	——	3.40
Parazone (dlvd.)	lb.	——	.68
PDA-10	lb.	.37	.42
Perflectol	lb.	.58	.65
Permalux (dlvd.)	lb.	1.53	1.55
Pyrogallic Acid, Resublimed	lb.	2.60	2.65
USP Crystals	lb.	2.10	2.15
Resorcin, Tech. (dlvd.)	lb.	——	.64
Santoflex B	lb.	.43	.50
BX	lb.	.57	.64
Santovar-A	lb.	1.30	1.37
Santowhite	lb.	1.40	1.52
S.C.R. (tons)	lb.	——	.32
Solux (dlvd.)	lb.	1.93	1.95
Stabilite (tons)	lb.	——	.48
Alba (tons)	lb.	——	.69
L (tons)	lb.	——	.48

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Tannic Acid, Tech.	lb.	.70	.79
Thermoflex (dlvd.)	lb.	1.48	1.50
A (dlvd.)	lb.	.76	.78
C (dlvd.)	lb.	.54	.56
Thymol	lb.	—	2.50
V-G-B	lb.	.43	.52

ANTI-SCORCHING AGENTS

Good-rite Vultrol	lb.	.55	.57
Retarder W (dlvd.)	lb.	—	.43
Salicylic Acid, Tech.	lb.	—	.38
Sodium Acetate 60-62% Crystals	lb.	—	.05½

ANTISEPTICS AND GERMICIDES

Formaldehyde (barrels)	lb.	—	.062
G-4	lb.	.95	2.50
G-11	lb.	3.50	5.50
Methyl Para Hydroxy Benzoate	lb.	—	1.50
Nuodex 100 SS (dlvd.)	lb.	—	1.50
Nuodex 100 W.O. (dlvd.)	lb.	—	1.80
Nuodex Zinc 8 (dms.) (dlvd.)	lb.	—	.19¾
Ortho Cresol (26°-27°)	lb.	—	.18
Soligen Drier—Copper 8% (drums)	lb.	—	.21
Zinc 8% (dms.)	lb.	—	.19¾
Vancide	lb.	—	.80

AROMATICS (DEODORANTS)

Arolene 1980 (c.l.)	lb.	—	.10
2286	lb.	—	.25
2553 (c.l., dms.)	lb.	—	.13
Bouquet 149	lb.	—	3.00
Coumarin	lb.	—	2.75
Curodex 19	lb.	—	4.75
188	lb.	—	5.75
198	lb.	—	6.75
D-6 Masking Perfume	lb.	—	1.35
Deodorant 65	lb.	—	1.00
Deodorant L-37	lb.	2.00	2.40
L-44	lb.	2.50	2.90
N.L.T.X.	lb.	1.85	2.15
Latex Perfume 5	lb.	—	3.25
6	lb.	—	7.50
9	lb.	—	.65
Neutroleum Delta	lb.	—	2.40
Gamma	lb.	—	3.40
Parador A	lb.	2.00	2.50
B	lb.	.65	1.00
C	lb.	2.75	3.25
D	lb.	1.50	2.00
E	lb.	.25	.75
Perfume Oil Bouquet Vanilla M	lb.	2.40	2.75
Rodo No. 0	lb.	4.00	4.50
No. 10	lb.	5.00	5.50
Rubbarome (dms.)	lb.	1.10	2.10
Rubber Perfume 7	lb.	—	9.15
12	lb.	—	1.90
Russian Leather 7	lb.	—	4.10
Vanillin	lb.	3.00	3.05

BLOWING AGENTS

Ammonium Bicarbonate (dlvd.)	lb.	.06¾	.09¾
Blowing Agent No. 15	lb.	—	.35
Sodium Bicarbonate, U.S.P. (c.l., bags)	cwt.	—	1.85
Sponge Paste	lb.	—	.20
Unicel (dlvd.)	lb.	—	.60
ND (dlvd.)	lb.	—	1.00
Urea	ton	73.00	90.00

BONDING AGENTS

Durez 12987	lb.	.48	.53
Interlake Resin No. 4162	lb.	—	1.50
MDI	lb.	7.25	7.75
50	lb.	3.60	3.85
Reanite	gal.	6.75	7.25
Rex Compound 482	gal.	—	1.05
Ty-Ply Q (and S)	gal.	6.75	8.00

COAGULANTS

Acetic Acid—56% (bbls.)	cwt.	—	9.80
Glacial—99½% (bbls.)	cwt.	—	15.50
Calcium Nitrate, Tech., Crystals	lb.	.12½	.15
Hydroxyacetic Acid—70% (dms.)	lb.	.059	.084
Zinc Nitrate, Tech.	lb.	—	.21½

COLORING AGENTS

Black

Carbon Black—See *Reinforcing Agents*			
Aquablak B (also M, R)	lb.	.08¼	.09¼
Aquablak S	lb.	.07¾	.08¾
Lampblack No. 10	lb.	.06	.09
Mapico Black Iron Oxide (50 lb. bags)	lb.	.0975	.1000
Raven Black Pure Iron Oxide	cwt.	9.75	10.00

Blue

Blue GD, Dispersed (dlvd.)	lb.	—	3.95
Paste (dlvd.)	lb.	—	1.80
Blue N (dlvd.)	lb.	—	.94½
Blue YD, Dispersed (dlvd.)	lb.	—	2.50
Milori Blue 11840 (dlvd.)	lb.	—	.42
Monastral Fast Blue CP (dlvd.)	lb.	—	3.85
PCD, Dispersed (dlvd.)	lb.	—	2.50
Ramapo Blue	lb.	3.40	3.45
Rubber Blue X-1999	lb.	—	1.00
Stan-Tone Blue	lb.	1.40	4.00
Ultramarine	lb.	.14	.30
Vansul Blue M.B.	lb.	1.00	2.45
Victoria Blue BP-262-D	lb.	2.25	2.30

Brown

Brown Iron Oxide	lb.	—	.10
Mapico Brown (50 lb. bags)	lb.	—	.1250

Green

Filo Green D-700 (and D-705)	lb.	—	.30
Green Chromium Oxide, Pure	cwt.	31.50	38 50
Green Chromium Oxide, Pure, Hydrated	cwt.	75.00	85.00
Green FD, Dispersed (dlvd.)	lb.	—	1.50
Monastral Fast Green GSD, Dispersed (dlvd.)	lb.	—	3.20
GSD Paste (dlvd.)	lb.	—	1.10
Permansa Green CP-594	lb.	—	1.35
Pigment Green B	lb.	—	1.50
GL-652D	lb.	.88	.93
Ramapo Green	lb.	4.00	4.05
Rubber Green X-1292	lb.	—	1.00
Stan-Tone Green	lb.	1.50	3.30
Utility Green	lb.	—	.30
Vansul Green M.B.	lb.	.85	2.35

Maroon

Stan-Tone Maroon	lb.	2.50	2.55
Vansul Maroon M.B.	lb.	2.45	2.60

Orange

Molybdate Orange	lb.	—	.39
Orange F (dlvd.)	lb.	—	3.65
FD, Dispersed (dlvd.)	lb.	—	2.75
Rubber Orange X-2065	lb.	—	2.60
Stan-Tone Orange	lb.	1.65	2.25
Vansul Orange M.B.	lb.	2.15	2.65

Red

Cadmium Red	lb.	.95	1.25
Cadmolith Red (bbls.)	lb.	1.10	1.35
Graphic Red (dlvd.)	lb.	—	.75
Indian Red, Pure	cwt.	10.00	10.25
Mapico Red 297 (50 lb. bags)	lb.	.1050	.1075
Oximony Iron Oxide	lb.	—	.09
Red Iron Oxide, Light	cwt.	10.25	10.75
Red PB (dlvd.)	lb.	—	1.90
PBD Dispersed (dlvd.)	lb.	—	1.65
2B (dlvd.)	lb.	—	1.75
2BD, Dispersed (dlvd.)	lb.	—	1.65
Rubanox Red CP-762 (dlvd.)	lb.	—	1.30
Rubber Red CP-339 (dlvd.)	lb.	—	1.05
Rubber Red RT-364	lb.	—	.75
Rubber Red RT-425	lb.	—	.75
Rubber Red X-1148	lb.	—	.75
Solfast Red CP-663 (dlvd.)	lb.	—	1.80
CP-787 (dlvd.)	lb.	—	1.30
Stan-Tone Red	lb.	1.10	1.55
Vansul Red M.B.	lb.	1.00	1.90
Watchung Red	lb.	—	1.90

White—Lithopone

Albalith	lb.	.06¾	.06¾
Astrolith	lb.	.055	.0578
Cryptone No. 19	lb.	.08¼	.08½
CB No. 21	lb.	.08	.08¼
Eagle	lb.	.06	.06¼
Permalith	lb.	.06	.06¼
Ponolith	lb.	.06⅜	.06¾
Sunolith	lb.	.055	.0578

White—Titanium Pigments

Rayox	lb.	.17½	.20½
Ti-Cal	lb.	.06¾	.07¼
Ti-Pure	lb.	.17½	.18½
Titanox A—all grades (dlvd.)	lb.	.17½	.18
B-30 (dlvd.)	lb.	.07	.07½
C (dlvd.)	lb.	.06¾	.07¼
RA—all grades (dlvd.)	lb.	.19½	.20
RC-HT (dlvd.)	lb.	.06¾	.07¼
Zopaque	lb.	.16½	.17¼

White—Zinc Oxide (American Process)

AZO-ZZZ 11 (and 22, 33, 44, 55)	lb.	.1100	.1125
Eagle	lb.	.1100	.1125
Horse Head Special	lb.	.1100	.1125
XX Red	lb.	.1100	.1125
Joxite	lb.	.0925	.0975
St. Joe Black Label	lb.	.1100	.1125
Green Label	lb.	.1100	.1125
Red Label	lb.	.1100	.1125

White—Zinc Oxide (Dispersed)

Dispersed Zinc Oxide	lb.	—	.13

White—Zinc Oxide (Fresh Process)

AZO-ZZZ 66	lb.	.1325	.1350
Eagle Green Seal	lb.	.1275	.1300
Eagle Red Seal	lb.	.1225	.1250
Eagle White Seal	lb.	.1325	.1350
Florence Green Seal	lb.	.1275	.1300
Red Seal	lb.	.1225	.1250
White Seal	lb.	.1325	.1350
Kadox 25	lb.	.1325	.1350
72	lb.	.1100	.1125
Black Label	lb.	.1100	.1125
Red Label	lb.	.1100	.1125
U. S. P. 12	lb.	.1425	.1450

White—Zinc Sulfide

Cryptone ZS-800	lb.	.1150	.1175

Yellow

Anchor Brand Pure Iron Oxide	cwt.	8.25	8.50
Cadmolith Yellow (bbls.)	lb.	—	.85
Chrome Yellow	lb.	—	.27
Chrome Yellow 12310	lb.	—	.27
Ferrox	cwt.	7.50	8.50
Mapico Yellow (50 lb. bags)	lb.	.0825	.0850
Rubber Yellow X-1940	lb.	—	1.60
Stan-Tone Yellow	lb.	1.20	1.75
Tolujidine Yellow	lb.	—	1.60
YL-556-D	lb.	—	.82
Oximony Iron Oxide	lb.	—	.06¾
Vansul Yellow M.B.	lb.	.85	1.00
Yellow G (dlvd.)	lb.	—	1.95
GD, Dispersed (dlvd.)	lb.	—	1.85
HN (dlvd.)	lb.	—	1.60
Zinc Yellow	lb.	—	.20

DISPERSING AGENTS

Agchem SA-19	lb.	—	.30
SA-20	lb.	—	.70
Aquasol-AR 90%	lb.	—	.14½
Beaconol 52	lb.	.60	.75
Darvan No. 1 (and No. 2)	lb.	.30	.40
Daxad 11 (21, 23)	lb.	.07	.35
Dilex	lb.	—	.32
Dispersaid	lb.	1.25	1.35
Halloid	lb.	.03¾	.09½
HornKem No. 1	gal.	—	1.60
No. 3G	gal.	—	1.75
No. 12	lb.	—	.17
Marasperse CB	lb.	.11½	.15
N	lb.	.09	.10
Ramol PW	lb.	.18	.19
Rubbex	lb.	—	.27⅜
Stan-Chem BQC	lb.	.12¼	.17¼
1067	lb.	—	.13½
1471	lb.	.1687	.2187
2251	lb.	.12¼	.17¼
Triethanolamine (drums) (dlvd.)	lb.	.21½	.22½
Triton R-100	lb.	.15½	.25
Yelkin TT	lb.	—	.22
Zinsper	lb.	—	.15

EXTENDERS

Advagum 1098	lb.	—	.65
Bunaweld Polymer No. 780	lb.	—	.22
No. 5514	lb.	—	.30
D-92 (and D-93) (dms.)	lb.	—	.12
Extender 600	lb.	—	.208
Multi-Plast MV 60 Emul.	gal.	.32	.37
PR-162 Latex (dms.)	gal.	1.00	1.60
Synprolac	lb.	—	.19
Synprowax	lb.	.16	.19
Vistanex	lb.	—	.32

FILLERS (Inert and Reinforcing)

Abrasives			
Carbonite	lb.	.15	.95
Lionite	lb.	.09¾	.90
Pumice	lb.	.03	.05
Aluminum Hydrate	lb.	—	.17
Aluminum Silicate			
Silical	ton	37.00	55.00
Marter White	ton	20.50	30.00
Barium Carbonate (l.c.l.)	ton	77.00	85.00
Barytes			
No. 1 Floated, White	ton	33.10	44.55
No. 2 Floated, Unbleached	ton	31.10	41.95
No. 22 Barytes (c.l.)	ton	—	18.37
Foam A	ton	—	30.10
Bentonite (c.l.)	ton	—	11.00
SPV Volclay (c.l.)	ton	—	11.00
Blanc Fixe	ton	72.50	120.00
Calcium Carbonate			
Atomite (c.l.)	ton	—	30.00
B.I. White No. 1 (c.l.)	ton	—	7.50
B.I. White No. 2 (c.l.)	ton	—	7.00
Blue-Star XX	ton	—	45.00
Calcene T	ton	40.00	50.00
Camelwite	ton	—	30.00
Kalite (c.l.)	ton	—	33.00
Lesamite (c.l.)	ton	—	27.50
Lim-Cal (c.l.)	ton	—	12.50
Millical (c.l.)	ton	—	25.00
Multifex	ton	—	105.00
Sierracal	ton	15.00	18.50
Suspenso (c.l.)	ton	—	22.00
Swansdown (c.l.)	ton	—	20.00
Witcarb R (c.l.)	ton	—	105.00
R-12 (c.l.)	ton	40.00	60.00

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Armour's 332 stock points mean fast, dependable service

U. S. P.... A chemically-pure, water-white glycerine, meeting all requirements of the U. S. Pharmacopoeia . . . for use in foods, pharmaceuticals, cosmetics or any purpose demanding highest quality. Specific gravity, 1.249—25° C./25° C.

HIGH GRAVITY... A pale yellow industrial glycerine. Specific gravity, 1.262—15.5° C./15.5° C.

DYNAMITE... Made especially for the explosives trade. Specific gravity, 1.262—15.5° C./15.5° C.

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HYDRAULIC RUBBER BALE CUTTER

CHECK THESE ADVANTAGES:

- Safety Feature: Knife Can Be Stopped and Reversed At Any Point in Its Cycle
- Cuts Various Shaped Bales of Smoked Sheets, Crepes, Balatas, Paras, etc.
- Opening Under Knife Is 30" Wide by 20" high*
- No Water or Other Cutting Lubricant Necessary

Special Feed and Take-Off Conveyors, Mechanical or Hydraulic, Can Be Supplied in Place of Manually Operated Feed Device Shown.

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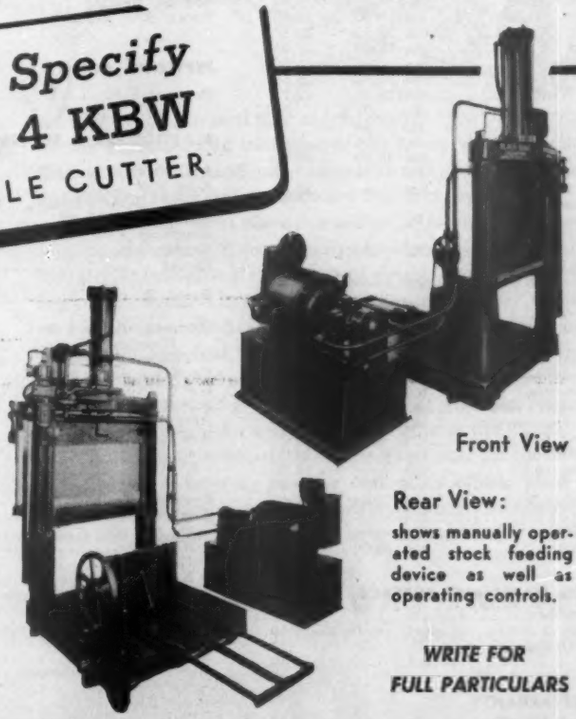

Front View

Rear View: shows manually operated stock feeding device as well as operating controls.

WRITE FOR FULL PARTICULARS

*4 KBWX has opening of 45" wide by 36" high

FINE BR TOOLS

BLACK ROCK MFG. CO.

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N. Y. Office, 261 Broadway

FILLERS (Cont'd)

Calcium Silicate			
Silene EF	ton	110.00	-120.00
Calcium Sulfate, Anhydrous			
Snow White Filler	ton	——	- 17.00
Calcium Sulfate, Hydrous			
Crysta-Cal (c.l.)	ton	——	- 12.50
Terra Alba No. 1	ton	12.00	- 14.40
Chalk Whiting (l.c.l.)	lb.	.0150	- .0175
Recco Paris Whiting	ton	——	- 26.00
Clay			
Alsite (c.l.)	ton	——	- 13.00
Aluminum Flake	ton	16.50	- 60.00
A.S.P. No. 1 (c.l.)	ton	——	- 35.00
No. 11 (c.l.)	ton	——	- 40.00
Buca (c.l.)	ton	——	- 44.00
Catalpo (c.l.)	ton	——	- 33.00
Champion	ton	——	- 13.00
C.S.D. (c.l.)	ton	——	- 12.00
Crown	ton	——	- 13.00
Dixie (c.l.)	ton	——	- 29.50
Hydratex R	ton	28.00	- 40.00
Kaolloid Clay (c.l.)	ton	——	- 10.50
Markham (c.l.)	ton	——	- 13.00
McNamee (c.l.)	ton	——	- 29.00
Oldham (c.l.)	ton	——	- 13.00
Paragon	ton	12.50	- 27.20
Recco (c.l.)	ton	——	- 13.00
Stellar-R	ton	——	- 50.00
Suprex	ton	13.00	- 27.70
Upton	ton	19.50	- 21.00
Whitetex (c.l.)	ton	——	- 50.00
Witco No. 1 (c.l.)	ton	13.00	- 33.00
No. 2 (c.l.)	ton	13.00	- 33.00
Diatomaceous Earth	ton	30.00	- 50.00
Kaylorite (c.l.)	ton	——	- 30.00
Dolomite (c.l.)	ton	11.00	- 12.00
Flock			
Cotton	lb.	.08½	- .20
Filfloc F 40-9000	lb.	——	- .16
Filfloc F 6000	lb.	——	- .22
Rayon, bleached or dyed	lb.	.85	- 1.50
Rayon, grey	lb.	——	- .18
Sofka-Floc (l.c.l.)	lb.	.05	- .12
Wool, bleached or dyed	lb.	.70	- 1.00
Glue, Bone (dlvd.)	lb.	.16½	- .18½
Graphite	lb.	.05	- .20
Ground Glass (l.c.l.)	lb.	.04	- .06
Leather, Shredded	lb.	.05	- .17
Lignin	lb.	.03	- .06
Indulin	lb.	——	- .09
Limestone, Pulverized	ton	3.25	- 10.00
Micro Velva	ton	30.00	- 32.00
Velvet Filler, Regular	ton	16.00	- 18.00
Magnesium Carbonate	lb.	.08	- .09
Clearcarb	lb.	.10¾	- .11¼
K & M	lb.	.08	- .09
Magnesium Oxide	lb.	.05	- .06
Magnesium Silicate	ton	18.00	- 35.00
Airex	ton	22.50	- 23.50
Asbestol	ton	17.00	- 25.00
Blue Star Talc	ton	——	- 21.00
L.S. Silver	ton	24.50	- 26.50
Sierra White	ton	20.75	- 22.75
Mica	lb.	.01¼	- .07¾
Concord	lb.	.07	- .07¾
Micro-Mica	lb.	.06¾	- .07½
Mineralite (c.l.)	ton	30.00	- 40.00
Silversheen	lb.	.06½	- .07
Triple A Mica (c.l.)	ton	——	- 25.00
Wet Ground Biotite Mica	lb.	.05½	- .06¼
Wet Ground Mica No. 160	lb.	.06¾	- .07½
Mineral Black			
Keystone 126	ton	——	- 13.00
Pyrophyllite			
Pyrax A (c.l.)	ton	——	- 30.00
WA (c.l.)	ton	——	- 31.50
Silica	ton	16.00	- 27.00
Blue Star	ton	——	- 21.50
Slate, Powdered (l.c.l.)	ton	15.00	- 20.00
Talc, Domestic	ton	9.00	- 20.00
Walnut Shell Flour	ton	38.00	- 80.00
Whiting, Commercial	ton	8.00	- 20.00
Cameline (c.l.)	ton	8.50	- 10.00
C-C-O White	ton	——	- 14.50
Keystone (c.l.)	ton	——	- 16.00
Rambo No. 1 White	ton	——	- 9.00
Snowflake (c.l.)	ton	——	- 18.00
Veroc (c.l.)	ton	——	- 8.50
York White (c.l.)	ton	——	- 9.00
Wood Flour	ton	20.00	- 62.18

FINISHING MATERIALS, SURFACE

Beaco Finishes	gal.	1.05	- 1.35
Black Out	gal.	4.50	- 8.00
Shellac, Orange Gum	lb.	.60	- .70
VanWax	gal.	1.25	- 1.30

FLAME RETARDANTS

Chlorinated Paraffin	lb.	.10	- .25
Halowax	lb.	.24	- .30
Zinc Borate 3167	lb.	.12	- .16¾
Zyrox	lb.	.71	- .79

LUBRICANTS, MOLD

Aquadag	lb.	3.15	- 3.45
Aquarex BBX Conc. (dlvd.)	lb.	——	- .78
D (dlvd.)	lb.	——	- .76
L Paste (dlvd.)	lb.	——	- .85
MDL Paste (dlvd.)	lb.	——	- .30
Borax, Granular (l.c.l.)	ton	70.00	- 80.00
Colite Concentrate (dms.)	gal.	——	- .90

LUBRICANTS, MOLD (Cont'd)

Concentrex	lb.	——	- .20
Dipex	lb.	.14	- .18
Dri-Lube	lb.	——	- .18
Erlen Mold Lubricant	gal.	1.25	- 1.50
Glycerized Lubricant	gal.	——	- 1.50
Glydag	lb.	1.30	- 2.00
Kokobace	lb.	——	- .12
Latex-Lube (dlvd.)	lb.	——	- .22¾
Liqui-Lube (dlvd.)	lb.	——	- .16¾
Lubrex	lb.	.25	- .30
Migralube	lb.	——	- .30
Môldex	lb.	——	- .12½
Moldeze No. 1	gal.	——	- 36.00
No. 2	gal.	——	- 10.00
No. 3	gal.	——	- 25.00
Mold Lubricant No. 72 Conc.	gal.	1.25	- 2.75
Mold-Slick	lb.	.202	- .215
Orvus WA Paste (dms.)	lb.	——	- .25
Prodag	lb.	.25	- .38
Redotex Flakes (dlvd.)	lb.	.24½	- .25
Powder (dlvd.)	lb.	.24⅞	- .25½
Rubber-Flo	gal.	——	- 1.15
Rubber-Glo	gal.	——	- .94
Rusco Mold Paste	lb.	——	- .18
Sericite (l.c.l.)	ton	65.00	- 75.00
Thermolube	lb.	——	- .11
Ulco Mold Soap	lb.	.16	- .29
Werkrite Flakes (dlvd.)	lb.	.22⅞	- .23½
Powder (dlvd.)	lb.	.23⅞	- .24½

LUBRICANTS, RUBBER

Lithium Stearate	lb.	.75	- .77
Propylene Stearate (drums)	lb.	——	- .40
Rubberol	lb.	——	- .18½

LUBRICANTS, RUBBER SURFACE

Barium Stearate	lb.	——	- .43
Calcium Stearate	lb.	——	- .48
Orel	gal.	1.85	- 2.00
Polyethylene Glycol	lb.	.25	- .26
Rexanol A	lb.	——	- .11
Separex A	lb.	——	- .15
Zinc Stearate	lb.	.54	- .55

MOLD CLEANERS

Actusol (dlvd.)	gal.	——	- 1.45
Metso 99	cwt.	3.05	- 4.45
Granular	cwt.	2.50	- 3.55
Rubber-Sol	gal.	——	- 1.89
Shelblast	ton	80.00	-140.00
Sodium Silicate	cwt.	.80	- 1.40
Sprex A.C. (dlvd.)	lb.	——	- .15½

PEPTIZING AGENTS

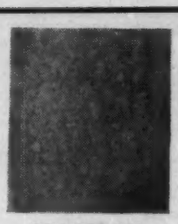
Peptizer P-12	lb.	.84	- .90

PLASTICIZERS & SOFTENERS

AA (drums)	lb.	——	- .15¾
Acto 500	lb.	——	- .09
Adipol BCA (dms.)	lb.	.44½	- .45
Amalgamator Z-4	lb.	——	- .30
American Pine Tar	gal.	.34½	- .45½
Bardex	lb.	.05	- .05¼
Bardol	lb.	.02¾	- .03¾
B	lb.	.05½	- .05¾
Bayol D	gal.	.29½	- .31½
F	gal.	.46	- .49
Beeswax, Refined & Bleached	lb.	.64	- .74
Yellow Refined	lb.	.63½	- .68
Bondogen	lb.	.55	- .60
B.R.C. No. 20	lb.	.0125	- .0135
B.R.H. 2	lb.	.02	- .029
BRS 700	lb.	.0175	- .026
B.R.T. 3	lb.	.024	- .025
4	lb.	.0225	- .0235
7	lb.	.0265	- .0275
B.R.V.	lb.	.0325	- .04
Bunarex Resins	lb.	——	- .075
Bunatak M	lb.	——	- .20
O	lb.	——	- .18
R	lb.	——	- .14
U	lb.	——	- .15
No. 21	lb.	——	- .08
No. 90	lb.	——	- .08
No. 865	lb.	——	- .17
No. 1080	lb.	——	- .09½
Burgundy Pitch	lb.	.1026	- .1050
Butac	lb.	.11	- .12
Butyl Benzyl Sebacate	lb.	.75	- .77½
Butyl Palmitate	lb.	——	- .26⅝
Butyl Roleate	lb.	.176	- .18
BWH-1	lb.	——	- .11
Campol (t.c.)	ton	——	- 42.00
Candelilla Wax, Prime	lb.	.78	- .85
Carbonex	lb.	.0325	- .0375
S Flakes	lb.	.0475	- .0525
S Plastic	lb.	.046	- .051
Carbowax 4000 (drums)	lb.	.29	- .30
Cardolite 615	lb.	.37	- .40
816	lb.	.25½	- .28½
5858	lb.	.42	- .46
Carnauba Wax, Crude	lb.	1.30	- 1.35
Refined	lb.	1.40	- 1.45
Substitute	lb.	.45	- 1.08
Yellow	lb.	1.75	- 1.80

PLASTICIZERS & SOFTENERS (Cont'd)

Celluflex 142 (and 179 (drums)	lb.	——	- .37½
Ceresine Wax	lb.	.15	- .20
Contogum	lb.	.06¾	- .10¼
Cumar Resins	lb.	.05½	- .14½
D.B.M.	lb.	——	- .30
Degras, Common	lb.	.10	- .14
Diamylphenol (l.c.l., dms.)	lb.	——	- .21
Dibenzyl Ether (drums)	lb.	——	- .40
Dibenzyl Sebacate	lb.	.66	- .70½
Dibutyl Phthalate	lb.	.36	- .385
Dibutyl Sebacate—Tech.	lb.	.75¼	- .77¾
C.P.	lb.	.77¾	- .80¼
Dicapryl Phthalate	lb.	——	- .45
Di-Carbitol Phthalate (dms.)	lb.	.39½	- .40
Dicyclohexyl Phthalate	lb.	——	- .43
Dielex	lb.	.0625	- .0650
Diethyl Phthalate (t.c.)	lb.	.31½	- .38½
Dihexyl Sebacate	lb.	.73¾	- .76¼
Dimethyl Phthalate	lb.	——	- .26
Dimethyl Sebacate	lb.	.77¾	- .80¼
Dinopol (dms.)	lb.	.46½	- .47
Dioctyl Phthalate (dms.)	lb.	.42½	- .43
Dipolymer Oil	gal.	.33	- .38
Dispersing Oil No. 10	lb.	.0525	- .055
Dutrex A (B, 5, 6)	lb.	.02½	- .03¾
15	gal.	.10	- .189
20, 21, 25	lb.	——	- .03
Econo-Plast (drums)	lb.	.03¼	- .03¾
ELA (dlvd.)	lb.	——	- .80
Estac	lb.	——	- .16
Ethox (dms.)	lb.	.38½	- .39
Flexol DOP	lb.	——	- .433
TOF	lb.	——	- .47
3GH	lb.	——	- .56
3GO	lb.	——	- .53½
4GO	lb.	——	- .43
H-70	lb.	.56¾	- .64½
Hercolyn (dlvd.)	lb.	.15½	- .16
Herron-H.T.	gal.	.2400	- .2700
Herron-Plas	lb.	.0350	- .0375
Herron-Wax	lb.	.0500	- .0550
HT-300	lb.	.45¾	- .53
Indonex 633½ (634½, 638½, 639½)	gal.	.11½	- .16
VG (dlvd.)	lb.	——	- .07
Indopol H-300 (bbls.)	gal.	1.28	- 1.32
JMH	lb.	——	- .65
Kapsol (dms.)	lb.	.44½	- .45
KP 23 (dms.)	lb.	.41½	- .42
70 (dms.)	lb.	.40½	- .41
120 (dms.)	lb.	.48½	- .49
140 (dms.)	lb.	.49½	- .50
150 (dms.)	lb.	.38½	- .39
Kronisol (drums)	lb.	.38½	- .39
Kronitex (drums)	lb.	.32½	- .37
Lanolin, Tech. Anhydrous	lb.	.20	- .26
Lead Oleate	lb.	.16½	- .42
Lindol (drums)	lb.	——	- .33½
2-Mercaptoethanol (drums)	lb.	——	- .75
Methox (dms.)	lb.	.35½	- .36
Methyl Oleate	lb.	——	- .20
Methyl Stearate	lb.	——	- .34
Monoplex DBS	lb.	.90	- .91
Monoplex DOS	lb.	.84	- .85
5 (dms.)	lb.	.98	- 1.00
11 (dms.)	lb.	.50	- .51
16 (dms.)	lb.	.45	- .46
Montan Substitute No. 506	lb.	.425	- .435
Montan Wax, Crude	lb.	.50	- .55
Monten Wax (c.l.)	lb.	.52	- .55
Monty Wax	lb.	——	- .35
Multi-Plast (drums)	lb.	.04½	- .05
Naftolen HV (and R-100) (drums)	lb.	.11	- .12
LV and MV (drums)	lb.	.05¼	- .05¾
Natac	lb.	.1050	- .1150
Neolene 210 (t.c.)	lb.	——	- .16
212 (t.c.)	lb.	——	- .14
220 (t.c.)	lb.	——	- .15
Nerium	lb.	——	- .09
Nevillac Resins (dms.)	lb.	.23	- .45
Neville Resins (dms.)	lb.	.09	- .14½
Nevindene Resins (dms.)	lb.	.11½	- .14½
Nevinol (dms.)	lb.	——	- .16
Nevoll	lb.	.03	- .04
Nevtex 10 (dms.)	lb.	——	- .08½
Nuba 1 (and 2) (dms.)	lb.	——	- .03½
3X (dms.)	lb.	——	- .05
15 (and 30) Oil (dms.)	lb.	——	- .17¼
781 Oil (dms.)	lb.	——	- .22
No. 480 Oil Proof Resin	lb.	——	- .17
Opalwax	lb.	——	- .45
Ortho-Nitrobiphenyl	lb.	.06	- .11
Ozokerite Wax No. 64 White	lb.	.31	- .32
Yellow	lb.	.25	- .26
P-1 (and 4, 6, 8, 20)	lb.	.26½	- .33
P-75	lb.	.66	- .72
Pale 4 (and 1000)	lb.	——	- .17¼
Palm Oil	lb.	——	- .11
Paradene Resins (dms.)	lb.	.05½	- .06½
Para Flux (dms.)	gal.	.18	- .19
2016 (l.c.l.)	gal.	.20	- .21
Para Lube (l.c.l.)	lb.	.046	- .048
Paraplex G-25	lb.	.90	- .91
G-40	lb.	.48¾	- .49¾
Parmo	lb.	.06	- .13½
Pentalene 90 (l.c.l., dms.)	lb.	——	- .17
92 (l.c.l., drums)	lb.	——	- .25



STABELAN
after 1100 hrs. UV exposure. **RESULT**—retains flexibility with only slight change and discoloration.

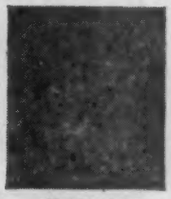
Results Count!

Comparison of STABELAN

with other commonly used stabilizers in Vinyl Films exposed in Miami, Florida . . . South Florida Testing Service.

TYPE "A" STABILIZER
after 300 hrs. UV exposure. **RESULT**—cracked and brittle, completely decomposed, black and badly discolored.

TYPE "B" STABILIZER
after 400 hrs. UV exposure. **RESULT**—badly cracked and brittle, turned black, discolored.



TYPE "C" STABILIZER
after 400 hrs. UV exposure. **RESULT**—stiffened, brittle and discolored.

STABELAN SUPERIORITY

proved by tests. Flex it . . . Expose it . . . Compare it . . . Don't spare it.

Additional details on request.

STABELAN CHEMICAL CO.
P.O. Box 665 **Toledo 1, Ohio**

NEW YORK

SOUTH ASIA CORP.
11 BROADWAY
NEW YORK 4, N. Y.
DIgby 4-2050

CRUDE RUBBER

Balatas — Gums — Guayule

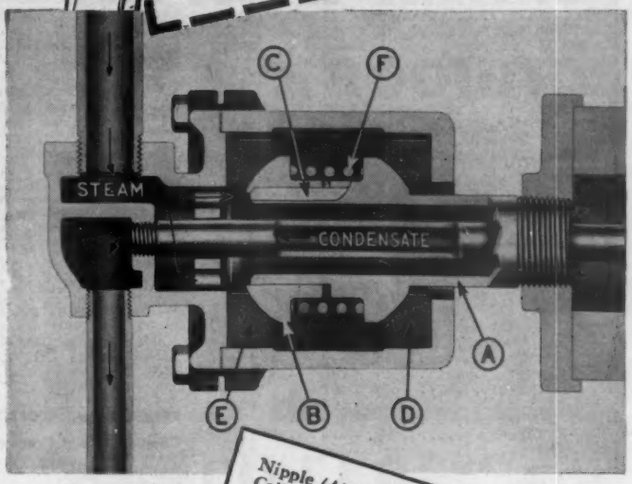
Synthetic Rubber

Liquid Latex

AKRON

E. P. LAMBERT CO.
FIRST NATIONAL TOWER
AKRON 8, OHIO
HEmlock 2188

. . . it's the biggest little trouble-saver in the mill . . .



Nipple (A) is connected to roll or drum. Collar (B) is keyed to it (C), but fits loosely so pressure can fill entire housing to act as sealing force. Both seal ring (D) and bearing ring (E) are of carbon-graphite, eliminate packing and oiling. Spring (F) is for initial seating only. Type B Joint shown; other types, sizes for all needs.

In terms of physical size alone, the Johnson Joint could hardly be called big machinery. But in its ability to save time and trouble, and promote plant efficiency, its stature approaches anything the industry has ever seen.

The Johnson Joint was designed to go after the old stuffing box and steam fit troubles in a business-like way, and it literally knocks the stuffing out of them. There's no packing of any kind. There's no oiling required, ever. There's no adjusting — the higher the pressure, the tighter the seal. There's little to fear from misalignment — with provision for both lateral and angular movement built right in. Note besides how neatly it provides for more efficient syphon drainage, through the same head that admits the steam.

In dollars and cents, what does all this add up to? Well . . . enough at least to pay the cost of switching over to Johnson Joints in just a short while. Enough certainly to make the Johnson Joint too big to overlook.

THE JOHNSON CORPORATION
868 WOOD STREET, THREE RIVERS, MICHIGAN

JOHNSON *Rotary Pressure* JOINTS

Write for literature and the name of your nearby Johnson representative.

PLASTICIZERS & SOFTENERS (Cont'd)

Pentaphen No. 114 (l.c.l., bags)	lb.	——	.23
Pepton 22	lb.	.70	.75
PG-16 (drums)	lb.	——	.34
Philplast No. 1	gal.	.18	.35
No. 2	gal.	.13	.35
Picco 10 (and 25)	lb.	——	.12
75 (and 100)	lb.	——	.11½
S.O.S.	gal.	.29	.34
Piccociser 30	lb.	.05½	.06
Piccolastic A (and B, C, D, E)	lb.	.24	.24½
F	lb.	.15	.15½
Piccolyte S Resins	lb.	.17	.20½
Piccoumaron Resins	lb.	.06½	.14½
Piccovar	lb.	.12	.12½
Piccovol	lb.	.02½	.04
Pictar	gal.	.25	.30
Plas-Blend 360	lb.	.03¾	.04½
Plastac M	lb.	——	.09¼
Plasticizer No. 1889	lb.	——	.77
No. 2869 (l.c.l.)	gal.	——	.23
No. 2070 (l.c.l.)	gal.	——	.30
Plasticizer SC	lb.	.50	.52
Plasticizer VA-1	lb.	——	.40
Plastoflex 50	lb.	.36	.37
J-21	lb.	——	.41
Plastogen	lb.	.07¾	.08
Plastolein X-55 (dms.)	lb.	——	.60
X-148 (dms.)	lb.	——	.70
Plastone	lb.	.27	.30
Polymel D	lb.	——	.20
Polymel Liquid	gal.	.12	.17
Polymel Resins	lb.	.029	.05
PT 400 (600, 800) (c.l., dms.)	gal.	.34½	.45½
Refrigerator Oil 145-R	gal.	——	1.25
Reogen	lb.	.11½	.12
465 Resin (drums)	lb.	——	.04½
Resin 731	lb.	——	.13¾
Resin C	lb.	.02	.0275
Resinex	lb.	.02¾	.03¼
L-4	lb.	.01¾	.02½
Ridbo 369 (drums)	lb.	.08	.09
369-F (drums)	lb.	——	.12
Rosin Oil	gal.	.54	1.20
R.P.A. No. 2 (dlvd.)	lb.	——	.65
No. 3 (dlvd.)	lb.	——	.46
No. 5 (dlvd.)	lb.	——	.57
R.S.O. Softening Oil	lb.	.03	.05
Rubtar	gal.	——	.40
Santicizer B-16	lb.	.50	.57
E-15	lb.	.47	.54
M-17	lb.	.44	.51
No. 140	lb.	.31	.38
Softener No. 20	gal.	.09	.25
S.P.C.	lb.	——	.19½
Stanolind Petrolatum	lb.	.037	.081
Wax	lb.	.25	.30
Staybelite Resin (dms.)	lb.	——	.11
Sunny South Burgundy Pitch	cwt.	10.51	10.75
Sunny South Pine Tar	gal.	.34½	.45½
Sunny South Rosin Oil	gal.	.50	.67¾
Superla Wax	lb.	.25	.30
Syncera Wax	lb.	.175	.225
Synplasticizer	lb.	——	.10
Syn Tac (c.l.)	gal.	——	.33
Synthol	lb.	——	.22½
Tar, Refined	gal.	.12	.17
K-Tarnel NR (t.c.)	lb.	——	.0851
Terpene A	gal.	——	.65
TP-90B (and TP-95)	lb.	.65	.75
TP98	lb.	.55	.65
Triacetin	lb.	.34	.45
Tricresyl Phosphate	lb.	.31	.38
Turgum S	lb.	.09½	.10½
Vanadiset B, C, D	lb.	.021	.055
Pulverized	lb.	.08½	.31
Solution	gal.	.40	.65
Vistac No. 1	gal.	——	1.32
No. 2	gal.	——	1.66
No. 4	gal.	——	1.80
Wilcor-Plast	lb.	.02⅛	.02⅝
Witresin—Granular	ton	41.00	43.00
Solid	ton	36.00	38.00

PROCESSING AIDS

Castor Oil, Processed (dms.)	lb.	——	.17¼
Refined (drums)	lb.	——	.15¾
Castorwax (min. 400 lbs.)	lb.	——	.25
Dutrex 7	lb.	.02½	.03¾
30	gal.	.24	.27
ELA (dlvd.)	lb.	——	.80
Heron S.P.O.	lb.	.22	.23
Resin No. 510	lb.	——	.19
Zeton (dms.)	lb.	——	.32

PROTECTIVE & STABILIZING AGENTS

Agchem SA-9 (to SA-12)	lb.	.65	1.02
Alpha Protein	lb.	.28	.32
Aroostocrat	lb.	——	.07½
Acacia	lb.	.12¾	.21
Carob Bean Flour	lb.	.42	.50
Casein	lb.	.33	.40
Ethylene Diamine 68%	lb.	.57	.58
Karaya Gum	lb.	.36	.45
Prosein	lb.	.071	.09
Rex Compound No. 2801	lb.	——	.15
Sodium Alginate	lb.	——	1.50

PROTECTING AGENTS (Cont'd)

Stablex B	lb.	——	.95
Tragacanth Flakes	lb.	.60	1.35

RECLAIMING AGENTS

1-D Heavy Oil (drums)	lb.	.04	.05
No. 517 H.B. Oil	gal.	.11½	.16½
535	gal.	.22	.27
No. 523 H.S. Oil	gal.	.22	.27
C-6 Oil (and 28, 32)	gal.	.33	.38
C-10 Oil	gal.	.25	.30
C-33 Oil	gal.	.21½	.26½
Caustic Soda—Flake 76% (c.l., drums)	cwt.	——	3.25
Liquid 50% (t.c.)	cwt.	——	2.25
Solid 76% (c.l., dms.)	cwt.	2.50	2.85
Cresylic Acid (99-100%)	gal.	1.20	1.29
D-4	gal.	.19	.24
E-5	gal.	.17	.22
Heavy Aromatic Naphtha (t.c.)	gal.	——	8.25
LX-83 Reclaiming Solvent	gal.	.13	.24
LX-572 Reclaiming Oil	gal.	.17	.28
PT 67	gal.	.60	.70
PT 101	gal.	.34½	.45½
PT 150 Solventene	gal.	.44	.45
Q Oil	gal.	.206	.256
Reclaiming Oil 1621	lb.	.025	.035
Reclaiming Reagent No. 3	lb.	.12	.15
Reclaiming Resin No. 1	gal.	.15	.35
R.P.A. No. 3 (dlvd.)	lb.	——	.46
Soda Ash (c.l., bags)	cwt.	——	1.20
Solvent 534	gal.	.22	.27
Solvent Oil 21	gal.	.24	.29
C-42	gal.	.30	.35
Wilcor Reclaiming Oil No. 111 (drums)	gal.	.28	.32
No. 151 (drums)	gal.	.28	.32
X-1 Resinous Oil	lb.	.0135	.02
X-60 Solvent	gal.	.22	.30

REINFORCING AGENTS—CARBON BLACK

Channel, Hard Processing (HPC) (bags)

Atlantic HPC-98	lb.	.0732	.1175
Continental F	lb.	.0732	.1125
Croflex	lb.	.0732	.1175
Crow	lb.	.0732	.1175
Dixiedensed (and S)	lb.	.0732	.1175
Huber HX	lb.	.0732	.1150
Kosmobile (and S)	lb.	.0732	.1175
Kosmos T	lb.	.0732	.1175
Micronex HPC	lb.	.0732	.1125
Spheron 4	lb.	.0732	.1170
Witco Disperso No. 6	lb.	.0732	.1125

Channel, Medium Processing (MPC) (bags)

Atlantic MPC-95	lb.	.0732	.1175
Continental A	lb.	.0732	.1125
Croflex TH	lb.	.0732	.1175
Dixie R-1	lb.	.0732	.1175
Dixiedensed HM (and S-66)	lb.	.0732	.1175
Huber TX	lb.	.0732	.1150
Kosmobile HM (and S-66, SMG)	lb.	.0732	.1175
Kosmos M	lb.	.0732	.1175
Micronex Standard	lb.	.0732	.1125
Spheron 6	lb.	.0732	.1170
Witco Disperso No. 1	lb.	.0732	.1125

Channel, Easy Processing (EPC) (bags)

Atlantic EPC E-42	lb.	.0732	.1175
Continental AA	lb.	.0732	.1125
Croflex 77	lb.	.0732	.1175
Dixiedensed 77	lb.	.0732	.1175
Kosmobile 77	lb.	.0732	.1175
Micronex W-6	lb.	.0732	.1125
Spheron 9	lb.	.0732	.1170
Witco Disperso No. 12	lb.	.0732	.1125
Wyex	lb.	.0732	.1150

Channel, Conductive (CC) (bags)

Dixie 5	lb.	.0740	.1175
Kosmink	lb.	.0740	.1175
Spheron C	lb.	.1200	.1600
I	lb.	.1000	.1400
N	lb.	.2200	.2500
Voltex	lb.	.1500	.1850

Furnace, Fast Extruding (FEF) (bags)

Statex M	lb.	.0550	.0950

Furnace, High Modulus (HMF) (bags)

Continex HMF	lb.	.0500	.0900
Dixie 40	lb.	.0500	.0900
Kosmos 40	lb.	.0500	.0900
Modulex	lb.	.0500	.0900
Philblack A	lb.	.0550	.0950
Statex 93	lb.	.0500	.0900
Sterling L	lb.	.0500	.0900
SO	lb.	.0550	.0950

Furnace, Reinforcing (RF) (bags)

Kosmos 60	lb.	.0732	.1150

Furnace, Semi-Reinforcing (SRF) (bags)

Continex SRF	lb.	.0350	.0750
Dixie 20	lb.	.0350	.0750

Furnace, Semi-Reinforcing (Cont'd)

Essex	lb.	.0350	.0750
Furnex	lb.	.0350	.0750
Gastex	lb.	.0350	.0750
Kosmos 20	lb.	.0350	.0750
Pelletex	lb.	.0350	.0750
Seminex	lb.	.0350	.0750
Sterling NS	lb.	.0350	.0750
R	lb.	.0350	.0750
S	lb.	.0350	.0750

Furnace, Fine (FF) (bags)

Statex B	lb.	.0575	.0975
Sterling 99	lb.	.0650	.1050
105	lb.	.0732	.1170
Vulcan	lb.	.0732	.1170

Furnace, High Abrasion (HAF) (bags)

Philblack O	lb.	.0732	.1132

Furnace, Very Fine (VFF) (bags)

Statex K	lb.	.0732	.1125

Thermal, Fine (FT) bags)

P-33	lb.	——	.0500

Thermal, Medium (MT) (bags)

Thermax (c.l.)	lb.	——	.0300

REINFORCING AGENTS—MISCELLANEOUS

Darex Copolymer No. 3	lb.	.39½	.42
No. X34	lb.	.39½	.42
Darex Copolymer Latex No. 3 (and X34)	lb.	.36½	.50
Durez 12687 (and 12707)	lb.	——	.32
Durez 13355	lb.	——	.26
Marbon B	lb.	.65	.75
S and S-1	lb.	.41	.48
Marmix	gal.	1.16	1.35
Naftex EPC	lb.	.084	.1025
HMF	lb.	.068	.09
MPC	lb.	.084	.1025
SRF	lb.	.058	.075
Pliolite S6 Resin	lb.	.41	.42
G Masterbatch	lb.	.40	.41
G50 Masterbatch	lb.	.40	.41
R Masterbatch	lb.	.43	.44
Wilcorite R Resins	lb.	.29	.35

RETARDERS

ESEN	lb.	.34	.39
Retardex	lb.	——	.51

RUBBER SUBSTITUTES

Mineral Rubber

38	ton	26.00	32.50
Black Diamond	ton	26.00	27.50
Byerlyte	ton	42.50	57.50
Gilsonite, Selects (c.l.)	ton	33.50	34.50
Hard Hydrocarbon (dms.)	ton	40.00	42.00
Herron Flake	ton	48.50	49.50
Mineral Rubber, solid	ton	41.60	43.00
Parmr (drums)	ton	26.00	30.00
Pioneer	ton	33.00	60.00

Vulcanized Vegetable Oils (Factice)

Amberex	lb.	.27	.38
Brown	lb.	.18	.38
Dispersed	lb.	.28	.49
Neophax	lb.	.20	.38
White	lb.	.13	.39

Miscellaneous Rubber Substitutes

Gilsowax	lb.	.04½	.05
Insulac	lb.	.06	.06½
Resin No. 1098 (drums)	lb.	——	.65
No. 1198	lb.	.31	.35
Wilmex M-4 (and M-6)	lb.	.05½	.06

SOLVENTS

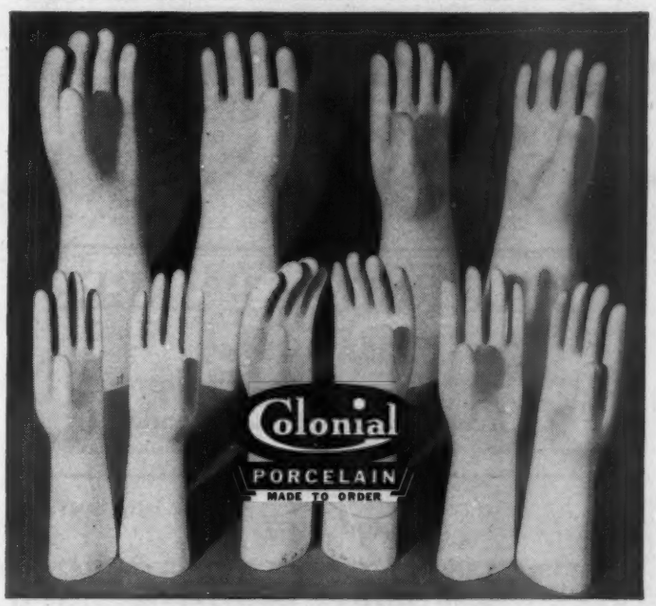
Acetone (dlvd.)	lb.	.08	.10
American Dipentene	gal.	.38	.39
Amsco Lactol Spirits (t.c.)	gal.	——	.14
Rubber Solvent (t.c.)	gal.	——	.13½
Solv A (t.c.)	gal.	——	.18½
Solv B (t.c.)	gal.	——	.22½
Special Napthalite (t.c.)	gal.	——	.13½
Textile Spirits (t.c.)	gal.	——	.14
Amyl Chlorides, Mixed (l.c.l.) (drums)	lb.	——	.08
Benzol 90%	gal.	.17	.24
Butyl Acetate (t.c.)	lb.	——	.305
Butyl Alcohol (t.c.)	lb.	——	.305
Secondary (dlvd.)	lb.	.10½	.12½
Tertiary (dlvd.)	lb.	.12	.14
Carbon Bisulfide, Tech.	lb.	.05	.08
Carbon Tetrachloride	gal.	——	.80
Cosol 1	gal.	.26	.34
Cosol 2	gal.	.25	.33
Cyclohexane	lb.	.08	.10
Cyclohexanone	lb.	.25	.27
Diacetone, Pure (dlvd.)	lb.	.12	.14½
Dichlorethyl Ether (dms.)	lb.	.16	.17
Formal (dms.)	lb.	.26	.27

WELCOME!

We welcome to the RUBBER AGE advertising family the following new advertisers this month:

DOW CHEMICAL CO. ..... see page 11
HOBBS MANUFACTURING CO. .. see page 99
JOHNSON CORPORATION ..... see page 121
GLENN L. MARTIN CO. ..... see page 23
SID RICHARDSON CARBON CO. . see page 128
SWIFT & CO. ..... see page 40, 41
WESTON ELECTRICAL INSTRUMENT CO. ..... see page 96

RUBBER AGE, the progressive rubber journal, constantly expands to bring you feature pages crammed with valuable information, and advertising pages that are designed to keep you well informed on all that is new and important in the rubber industry. Examine the advertisements of the reputable dealers and manufacturers who speak to you monthly through the pages of RUBBER AGE!



Porcelain Glove Forms

—for dipped rubber gloves, including linemen's or electricians' gloves and surgeons' gloves. Some are made from our own stock molds and others from customers' molds.

Write today for our new catalog covering rubber glove and other forms for dipped rubber goods. Prompt attention given to requests for quotations based on your specifications or stock items.

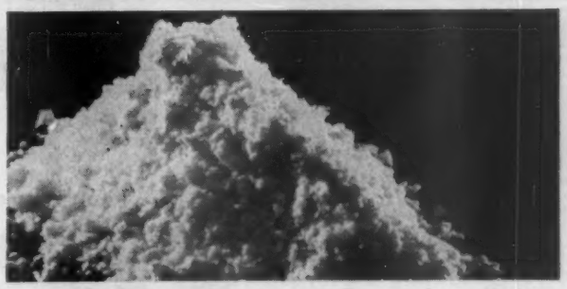
The Colonial Insulator Company

936 Grant St.
Akron 11, Ohio

Chicago Office:
2753 W. North St.

Rayco Fillers

For Non-Marking Sole Compounds



"FILFLOC"

REGISTERED UNDER U. S. No. 431,067

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SOLVENTS (Cont'd)

Dichloropentane (l.c.l.)	lb.	—	.04½
Dipentene 122 (dms.)	gal.	—	.51
Ethyl Alcohol (t.c.)	gal.	—	.96
Ethylene Dichloride (drums, dlvd.)	lb.	.08	.09½
Halowax Oil	lb.	.27	.30
Heptanes (t.c.)	gal.	—	.15
Hexalin Cyclohexanol	lb.	.20	.22 a
Hexanes (t.c.)	gal.	—	.15¾
Isopropyl Alcohol, Ref. 99% (dlvd.)	gal.	.45	.57½
Ether, Ref. (dlvd.)	lb.	.04½	.06½
Mesityl Oxide (dlvd.)	lb.	.11½	.14
Methanol (dms., dlvd.)	gal.	.41	.56½
Methyl Acetone, Syn. (drums, dlvd.)	gal.	.46	.52
Methyl n-Amyl Ketone (drums)	lb.	.37	.39
Methyl Ethyl Ketone	lb.	.10½	.12½
Methyl Isobutyl Ketone (dlvd.)	lb.	.13½	.15½
N-5 Pentane Mix. (t.c.)	gal.	—	.06½
N-6 Hexanes (t.c.)	gal.	—	.11¼
N-7 Heptanes (t.c.)	gal.	—	.10½
Petrolene (t.c.)	gal.	—	.10⅛
Picolines, Alpha, Refined	lb.	.30	.34
Mixed	lb.	—	.30
Pyridine, Refined	lb.	.65	.69
Quinoline	lb.	.43	.52
Rubber Solvent (t.c.)	gal.	—	.12½
Rubsol (t.c.)	gal.	—	.08625
Skellysolve B (Hexanes) (t.c.)	gal.	—	.141
C (Heptanes) (t.c.)	gal.	—	.133
E (Octanes) (t.c.)	gal.	—	.155
R (Solvent Naphtha)	gal.	—	.109
Solvenol	gal.	—	.51
Solvent, Crude, Light	gal.	.19	.28
Solvesso 100 (t.c.)	gal.	—	.2812
150 (t.c.)	gal.	—	.2812
Sunny South Dipentene	gal.	.38	.39
Toluene (drums)	gal.	—	.28
Toluol (t.c.)	gal.	—	.23
Trichlorethane	lb.	.11	.12
Triglycol Dichloride (dms.)	lb.	—	.49
Tromex	lb.	.078	.083
X-7 Sp. Heptanes (t.c.)	gal.	—	.10
X-8-A Solvent Naphtha	gal.	—	.07¾
Xylene (drums)	gal.	—	.28

STABILIZING AGENTS (for Vinyl Resins)

Dutch Boy DS-207	lb.	—	.48
Plumb-O-Sil A	lb.	—	.26
Tribase	lb.	—	.22¼
Eagle Basic Silicate White Lead	lb.	.18½	.19¾
Lead Stearate, Precip.	lb.	.55	.57
Fused	lb.	.60	.62
Stabelan A	lb.	.55	.65
Stabilizer No. 1	lb.	1.55	2.05
Stabilizer No. 32	lb.	.75	1.15
Stabilizer V-7939	lb.	—	.60
Stabilizer JCX	lb.	—	.45
SN	lb.	.36	.42
V-1-N	lb.	.44	.50
V-9	lb.	—	.85
Vanstay	lb.	.33	.35

SUN CHECKING AGENTS

Antisol	lb.	.25	.26
Heliozone (dlvd.)	lb.	.25	.26
Sunproof	lb.	.25	.30
Jr.	lb.	.18	.23
Tonox	lb.	.50	.59

TACKIFIERS

Advaresin 100	lb.	.13½	.14
Agchem RC 30	gal.	.65	1.34
Amberol ST-137X	lb.	.33	.33½
Beckopol 1400 (dlvd.)	lb.	.25	.25½
Dutrex 44	gal.	—	.919
E-310 Resin Emulsion	lb.	—	.14
Galex	lb.	.13¼	.25
Koresin	lb.	.46	.58
Lindol Emulsion (drums)	lb.	—	.38
Liquid Rubber Flux	lb.	—	.125
Pentacizer 344	lb.	—	.20
Pentalyn Resins (dlvd.)	lb.	.19½	.22½
Resin V	lb.	—	.23¼
Rubtack	lb.	—	.12
Staybelite Esters (dlvd.)	lb.	.19½	.22½
Super-Beckacite No. 1001 (dlvd.)	lb.	.42	.42½
Wilcorite R-30	lb.	—	.40

THICKENERS (FOR LATEX)

Acrysol GS	lb.	.14½	.22
Betanol (drums)	lb.	—	.70
Emulsorex No. 5	lb.	—	.35
Propylene Laurate (dms.)	lb.	—	.36
Sodium Silicate	lb.	.01	.02

VULCANIPING AGENTS

Selenium

Vandex	lb.	—	2.00

Sulfur

Crystex (l.c.l.)	lb.	.19½	.23
Dispersed Sulfur	lb.	—	.09
No. 2	lb.	.10	.15
Devil (c.l.)	cwt.	—	1.35
Insoluble Sulfur 60	lb.	—	.16
Star (c.l.)	cwt.	—	1.85
Tire	cwt.	1.50	2.00
Tube (c.l., dlvd.)	cwt.	2.00	2.60

Tellurium

Latex Telloy	lb.	—	2.00
Telloy	lb.	—	2.00

Miscellaneous Vulcanizing Agents

VA-3	lb.	.55	.65
Vultac No. 1	lb.	.38	.45
No. 2	lb.	.38	.45
No. 3	lb.	.42	.49

WASHING & FINISHING AGENTS

Apcolene (t.c.)	gal.	—	.09⅜

WETTING AGENTS

Advawet No. 15	lb.	—	.18
No. 33	lb.	.40	.43
Aerosol OT 70% Clear	lb.	.80	1.00
Agchem SA-15 (16, 18)	lb.	.17	.29
Alrosol (dms.)	gal.	—	.48
Aquarex ME (dlvd.)	lb.	—	.92
NNS (dlvd.)	lb.	—	.60
NS (dlvd.)	lb.	—	.75
Areakap 50	lb.	.30	.38
Dry 100	lb.	.60	.72
Aresket 240	lb.	.30	.38
Dry 300	lb.	.60	.72
Aresklene 375	lb.	.42	.57
Dry 400	lb.	.70	.84
Lecithin	lb.	—	.22
Santomerse D	lb.	.43	.65
S	lb.	.13	.25
Sorbit P	lb.	—	.28
Stablex G	lb.	—	.70
Triton K-60	lb.	.33½	.41
N-100	lb.	.59½	.67
R-100	lb.	.14½	.25
720	lb.	.30½	.38
770	lb.	.21¾	29¾
Vultamol	lb.	—	.17½

MISCELLANEOUS CHEMICALS

Acto 450 (550-W, 600, 630)	lb.	.109	.145
Agchem SA-17	lb.	—	.29
Aquarex SMO (dlvd.)	lb.	—	.50
A.S.T.M. Oil No. 1 (and No. 3)	gal.	1.00	1.25
Black Shield 4701	lb.	—	.21
Copper Inhibitor X-872-L	lb.	—	1.75
2-Ethylhexanol (dms., dlvd.)	lb.	.25	.26
Glycerine, 88% Sap., Crude (dlvd.)	lb.	.35½	.36
Hydrozo	lb.	—	.51
MODX (tons)	lb.	—	.29½
Para Resin No. 1784	lb.	—	.09¾
No. 2457 (c.l.)	lb.	—	.04
No. 2718 (c.l.)	lb.	—	.04
pHR	lb.	—	2.00
Pigmented Filmite	lb.	—	.16½
Resin No. 1226	lb.	.31½	.36½
Resorcinol (dlvd.)	lb.	—	.64
Rio Resin	lb.	.48	.50
Santocel	lb.	—	.50
Serictic, PA No. 400	lb.	.02	.03
Sublac	lb.	.31	.34
Synpep N (drums)	lb.	—	.54
Thiokol LP-2	lb.	.85	.95
LP-3	lb.	.85	.95
Tysonite	lb.	.21½	.22¼
Vanfre	gal.	2.00	2.50
Vinsol Resin—Lumps	lb.	—	.06

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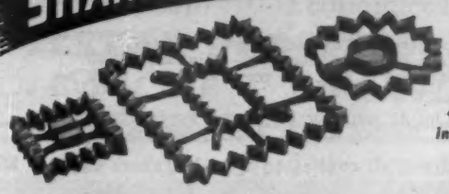

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MANUFACTURERS' REPRESENTATIVE, Chemical Engineer, Rubber Technologist. Seventeen years' practical experience in proofing, adhesives—rubber pyroxylin, reclaim, gutta percha, vinyls, and synthetic rubbers. Compounding, production, and sales. Will represent in Boston and New England. Address Box 110P, RUBBER AGE.

RUBBER CHEMIST, B.S., six years' diversified experience in compounding, development, and factory processing on mechanicals, sponge, and small tires, desires position with a future in a progressive company in laboratory or technical sales. Good appearance and personality. Address Box 112P, RUBBER AGE.

PLANT SUPERINTENDENT, fully experienced in extrusion and insulated wire. Able to handle compounding, testing, mixing, and quality control of rubber and plastic compounds. Able, energetic, and sincere. Married. Available for responsible position on reasonable notice. Location immaterial. Address Box 113P, RUBBER AGE.

RUBBER CHEMIST, under thirty, seven years of compounding experience for the processing of rubber and vinyl plastics for the tire and wire insulating industries. Capable of supervising a research program. Location immaterial. Minimum salary, $5,000. Address Box 114P, RUBBER AGE.

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HYDRAULIC PRESSES FOR SALE: One Watson-Stillman 225 ton, 30" x 28" platens, 16" ram; Three Southwark 225 ton, 31" x 19" platens, 16" ram; One Burroughs 150 ton, 28" x 13" platens, two 19" rams; Two Baldwin-Southwark 110 ton, 24" x 18" platens, 11" ram; Three Watson-Stillman 60 ton, 12" x 12" platens, 8" ram; One 12 ton, 15" x 15" platens, 31" ram; Two Steam-driven Hydraulic Pumps, 15 and 30 GPM, 3,000# and 5,000#; One 16" x 36" Rubber Mixing Mill with drive and 50 h.p. Motor; One Baker Perkins 100 gallon Jacketed Double Arm Mixer; Twenty-five Stokes Preform Presses, single punches and rotary ½" to 2½"; Double Arm Mixers 4 to 150 gallon; Ball & Jewel #0 to #1 Rotary Cutters. BRILL EQUIPMENT COMPANY, 225 West 34th Street, New York 1, N. Y.

FOR SALE: Hydraulic Presses: 30" x 52", 24" ram, 700 tons; 30" x 30", 20" ram, 1,000 tons; 30" x 30", 17" ram, 340 tons; 20" x 24", 19" ram, 350 tons; 42" x 42", 16" ram, 250 tons; 36" x 36", 16" ram, 250 tons; 16" x 36", 12" ram, 141 tons; 36" x 52", 14" ram, 385 tons; 26" x 30", 15" ram, 177 tons; 24" x 26", 10" ram, 118 tons; 19" x 24", 10" ram, 78 tons; 23" x 17", 8" ram, 75 tons; 22" x 15", 8" ram, 75 tons; 15" x 15", 8" ram, 75 tons; 12" x 12", 7½" ram, 50 tons; 12" x 12", 6½" ram, 42 tons; 8" x 9½", 4½" ram, 20 tons; 16" x 16", 3½" ram, 12 tons; 20" x 20", 13" ram, 166 tons. Pumps: New Dual Pumping Units; HPM Triplex 1½ GPM, 2,500#; Robertson Duplex 1⅓ GPM, 4,000#; Worthington 2½ GPM, 4,000#; Watson-Stillman Duplex 1 GPM, 2,500#; 4 plunger 6 GPM, 2,000#. Laboratory Presses, all sizes. Laboratory Mills, new units 6" x 12" m.d. Mills 10" x 24" and 16" dia. rolls, 30", 36", 40", 42" face, with drives. Extruders: Royle Perfected Nos. 1 and 3. W & P unjacketed 100 gal. sigma blade Mixer. Hydro-Pneumatic and weighted type Accumulators. Vulcanizers, etc. Highest prices paid for your used machinery. UNIVERSAL HYDRAULIC MACHINERY COMPANY, 285 Hudson Street, New York 13, N. Y.

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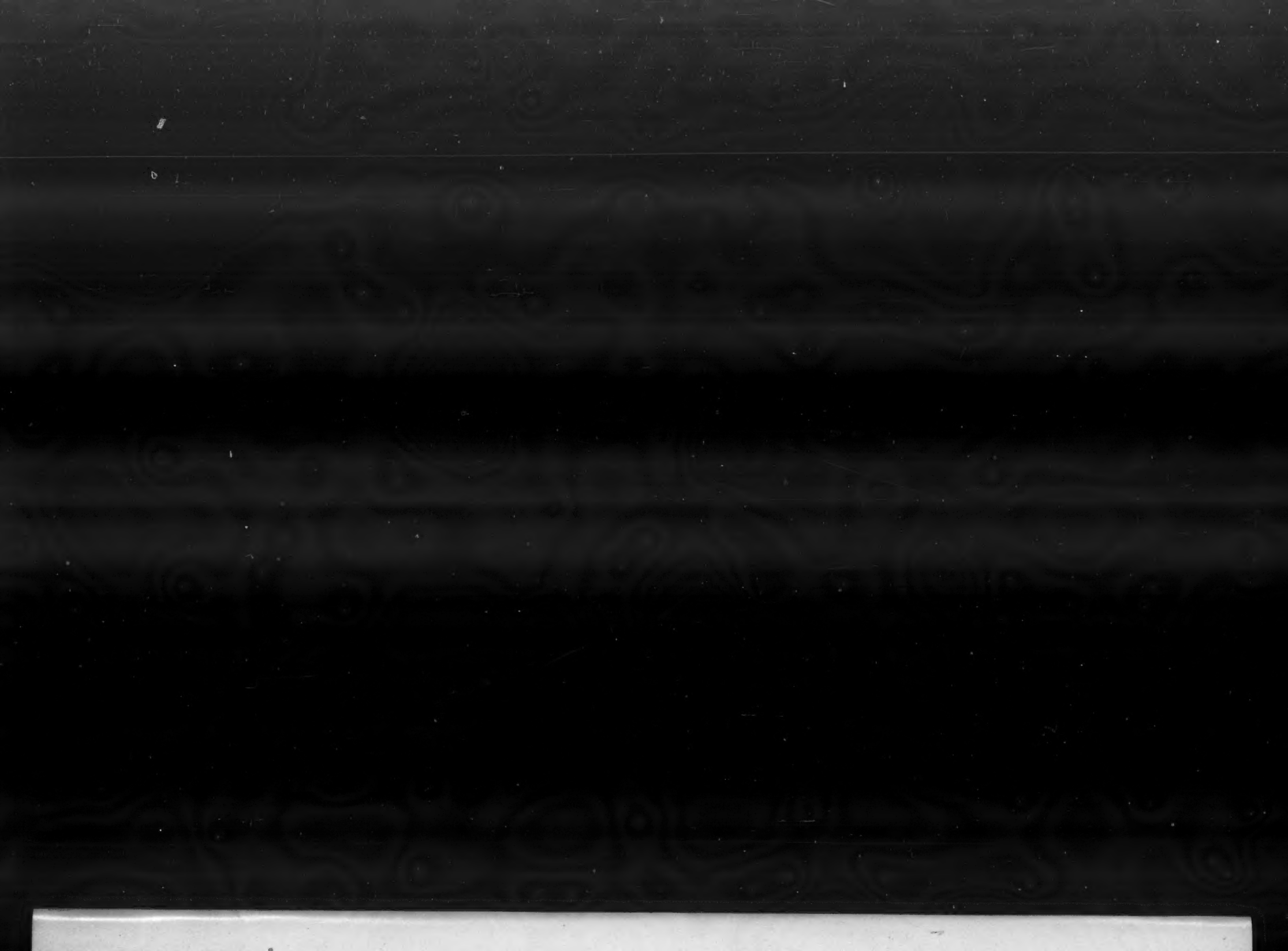

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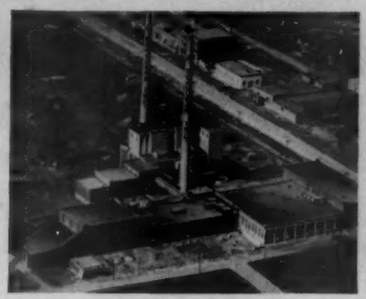

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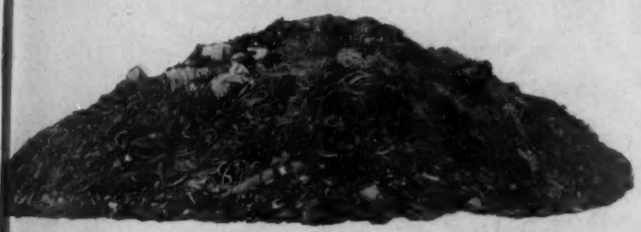

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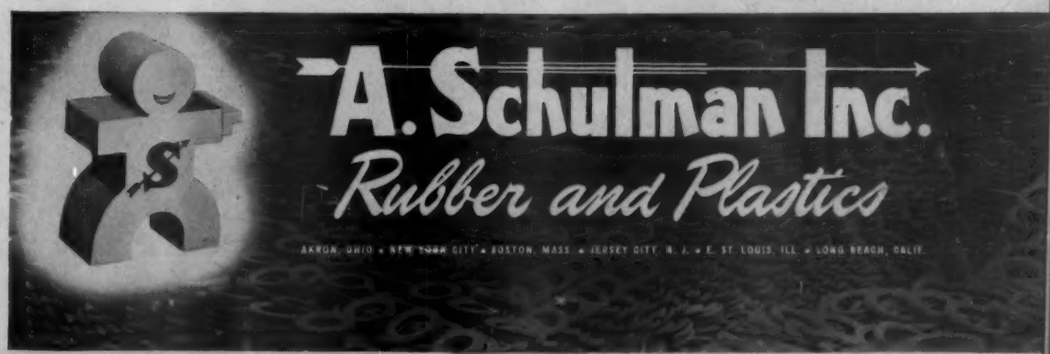

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